ESTABLISHED IN 1872

PAPER TRADE JOURNAL

With Which Is Combined

Vol. XCII, No. 26 — PAPER — Thursday, June 25, 1931

I. P. Co. Buys Tonawanda Book Paper Mill

Purchase Price Is Approximately $4,000,000 and Payments Are to Be Made Over a Term of Years—Mill Was Built in 1926 by the Tribune Co. of Chicago To Supply Book Paper for "Liberty" Which Was Recently Sold to MacFadden Publications—International's Book Paper Mills In United States Now Have Capacity of 150,000 Tons Per Year

[FROM OUR REGULAR CORRESPONDENT]

The Tonawanda book paper mill of the *Chicago Tribune* operating at North Tonawanda, N. Y., under the name of the Tonawanda Paper Company has been sold to the International Paper Company, it was announced on Monday, June 22. The purchase price was approximately $4,000,000, and it is understood that the payments are to be made over a term of years.

The International Paper Company is to supply until 1942 all the rotogravure paper used by the *Chicago Tribune* and the *Daily News*, New York's picture newspaper, and all the news print paper used by the *Daily News* and the *Detroit Mirror*, recently acquired by the Tribune Company of Chicago.

These papers are the largest users of rotogravure paper in the United States and the *Daily News*, New York's picture newspaper, uses more news print than any other newspaper in the United States. The total sale of paper under these contracts will exceed $115,000,000. Max Annenber and Roy C. Holliss represented the *Chicago Tribune* and the *Daily News* in these transactions. The International Paper Company was represented by W. N. Hurlbut.

The Tonawanda Mill, located in New York State, on deep water about fifteen miles from Niagara Falls, has a capacity of 40,000 tons a year and was built in 1926 by the Tribune Company of Chicago to supply the book paper used by *Liberty Magazine*, which was recently sold to the MacFadden Publications.

The International Paper Company book paper mills in the United States now have a capacity of 150,000 tons of book paper per year, making the company one of the largest book paper producers in the country. It is also the largest producer of news print and kraft wrapping paper in the world. The International Paper Company has supplied the *Daily News* with its news print since the inception of the paper ten years ago. The prices for paper under the contract will be The International Paper Company standard prices as announced recently by the company.

S. L. Willson Says Low Point Is Reached

[FROM OUR REGULAR CORRESPONDENT]

HOLYOKE, Mass., June 23, 1931.—Following the return of President Sidney L. Willson from his tour to the Pacific coast of some seven weeks, accompanied by Vice President Rufus B. D. Ewing, he gave out the following impressions from his tour:

"During the past six weeks a careful analysis and study of business conditions has been made by officials of the American Writing Paper Company, Inc., in all parts of the country, except the extreme northwest, and opportunity was also afforded through contacts with businessmen from that section to add their reports and opinions to those personally made.

"The opinions expressed all over the country were uniformly the same and seemed to indicate a strong belief that the lowest business depression point has been reached. There was some difference in opinion as to whether an immediate improvement would take place or whether it would begin in the fall of this year or the early months of next year. These opinions harmonize with those of the principal forecasters of business conditions. We are inclined to the belief that no immediate change will take place, since we are now in the seasonal period of low business, but we look forward with confidence to an improvement beginning in October.

"The American Writing Paper Company, Inc., has the same difficult management and serious sales problems as other companies, which necessitate greater economies and greater sales effort—but from these added burdens come experiences which in the future will result in greater prosperity for the company. The application of 'horse sense,' 'hard work,' 'patience' and 'nerve' will carry through this depression any company with sound business policies in their operations and their merchandising."

C. R. McMillen Joins St. Regis

Directors of the St. Regis Paper Company have elected as vice-president and director Charles R. McMillen, who has resigned as president of the Union Bag and Paper Corporation and become chairman of the board of directors of that company, succeeding M. D. Wallace. Mr. McMillen will take up his new duties with the St. Regis at once and will be located at the company's office at 60 East 42nd street, New York.

Alexander Calder has been elected executive vice-president of the Union Bag and Paper Corporation in charge of their entire operations. He has been associated with the company for a considerable number of years.

Idle Abitibi Mills May Be Reopened Shortly

Premier Henry and Minister of Lands and Forests Finlayson Confer With Directors of News Print Organization Regarding Situation At Sturgeon Falls and Sault Ste. Marie—Plants May Soon Be Operated On Part-Time Basis

[FROM OUR REGULAR CORRESPONDENT]

TORONTO, Ont., June 22, 1931.—As a result of conferences which Premier George S. Henry and the Hon. William Finlayson, Minister of Lands and Forests, had during the past few days with the board of directors of the Abitibi Power and Paper Company in Toronto, there is hope, it is stated, that the tonnage of the company's Iroquois Falls mills is to be so allocated in the near future as to provide for the operation, on a part-time basis at least, of its now idle plants at Sault Ste. Marie and Sturgeon Falls. The conferences are continuing and neither statement or comment from the Government or the Abitibi company have as yet been forthcoming. Strict silence is being maintained, it is said, in order that the present negotiations may in no way be jeopardized. If a formal statement is issued from the get-together it will likely come from the Abitibi people and have to do with plans for recommencing operations in their closed mills. Gravity of the unemployment situation in both Sturgeon Falls and Sault Ste. Marie is said to have been vigorously impressed by the Government upon the company, and the latter is said to be striving to meet the Government's wishes to the full in this connection.

May Call Special Session of House

The suggestion that a special meeting of the Ontario Legislature be called to consider the best means of solving the news print problem in order to relieve the serious unemployment situation in the North was advanced by James Lyons, member for Sault Ste. Marie, at a conference in Toronto between a delegation from the Northern Ontario city and Premier Henry James Curran and several mill workers made up the delegation.

Pointing out that there were 650 men out of work in Sault Ste. Marie through the closing of the Abitibi Pulp and Paper mill seven months ago, Mr. Lyons declared that some provision would have to be made for these men. "I know the Government is in a serious situation but these men must have help," he said. "The situation is steadily growing worse and there appears to be no hope of getting the mill started again. I think the news print problem should be taken up by the members of the Legislature at a special session." Mr. Lyons said that there were four million cords of pulpwood lying idle at the mill and he declared that the Government should not allow new timber to be taken out until this wood has been converted into the finished product.

Mr. Curran spoke of the distress in Northern Ontario and said that unless the mill was re-opened, or the Government came to the rescue, the prospect for next winter was a gloomy one indeed. Premier Henry said he realized the hardships of the people who depended upon the mill for their livelihood and he declared that the Government was straining every effort to alleviate the situation. Negotiations with mill owners had been held and while no definite result had been achieved, he was hopeful of some progress being made before long.

Toronto Firm to Build in Vancouver

Barber-Ellis, Ltd., wholesale paper dealers and envelope manufacturers, Toronto, have announced that they will shortly commence the construction of a new warehouse on Homer street, between Smythe and Nelson streets, in Vancouver, B. C. The new building will be four stories in height and will cost approximately $75,000. It will be of complete fireproof construction. Decision to proceed with the erection of the new plant was reached following a recent visit of C. G. Ellis, managing director of the firm. The organization has now established warehouses in all the major cities across Canada, with their head office in Toronto. The new structure will have a frontage of 75 feet on Homer street and will be 120 feet deep. The Vancouver branch of Barber-Ellis Ltd. has been carried on for the past nineteen years, and has been for a considerable time past under the management of Lorne D. Graham.

May Print Canadian Editions Here

The Paper trade is deeply interested in the possibility of some of the largely circulated United States publications with big business in Canada establishing printing plants in this country as the result of the big increase in the tariff rates on American magazines entering this country. It may mean some good-sized additional paper accounts. William V. Reidy, district supervisor of the International Magazine Company, has confirmed the reports current in Toronto that several magazines published by the Hearst interests might be printed in Toronto, and negotiations are now proceeding in Ottawa between Government officials and representatives of United States magazines, together with retailers and distributors. If the Government is willing to include the Hearst magazines among those for which tariff exemption is being sought, the idea of printing the magazines here, of course, will be abandoned. Mr. Reidy stated that when the prospect of a tariff arose a year ago, a Hearst publishing representative ascertained that copies for Canadian distribution could be printed in Toronto printing establishments, and it was determined that little difference would be noted in the reproduction of photographs, color work and special printing styles.

Business Men Visit Big Paper Plant

According to recent advices from Vancouver members of the Vancouver Board of Trade recently paid a visit to the news print plant of the Powell River Company at Powell River, B. C., which town has now a population of over 5,000 and has made many improvements during the past few months. The visitors saw one of the fastest news print machines in the world with an output of 1,260 feet of finished paper per minute. The new unit completed last year added $8,000,000 to the capital stock of the great Powell River plant, and an investment of $30,000,000 is now represented in what is said to be the second largest news print plant on the continent, Powell River news print goes to all part of the world, although shipments of late have been somewhat below normal. Robin Bell-Irving is manager of the plant, the average annual output of which is valued at about $8,000,000.

Newfoundland Mills Working at Capacity

While the paper mills of Canada and the United States

are operating at only two-thirds capacity, those in Newfoundland are producing about 91 per cent. of their usual output. For the first four months of this year some 95,000 tons of paper were turned out, an average of nearly 25,000 tons a month. This is a new record for the Newfoundland mills. Many factors contribute to this excellent showing by the news print manufacturing industry of Newfoundland. There are two large news print plants on the island. One of these has been operated for many years by the Anglo-Newfoundland Development Company, and supplies news print paper to certain dailies in London, England. The other is the more recent mill erected by International Power and Paper Company.

Notes and Jottings of The Trade

Capt. R. L. Graham shipped 1,200 cords of pulpwood lately to Buffalo to be transshipped to the mill at Johnstonburg, Pa. The barge *Salvus* towed by the tug *Strathbogie* of the Burke Towing Company, Midland, Ont., handled the shipment. The bulk of the cargo was loaded at La Cloche Island, with about 150 cords taken on at West Bay to make a full load. This is the first shipment of pulpwood from Manitoulin Island this year and it is expected several more large shipments will be made later in the summer.

Thirty-five men are engaged in planting 100,000 pine trees in Burleigh Township in Peterborough County. They are engaged by the Ontario Department of Lands and Forests under a policy of reforestation that has extended to Peterborough County. The young trees are about nine to twelve inches long.

The sympathy of many in the paper trade in Toronto was extended to M. J. Griffin, of Dominion Containers, Ltd., Montreal, in the death of his wife which took place recently. Mr. Griffin is the dean of carton salesmen in Montreal and district.

Congratulations were extended to H. S. Hall, of the A. D. Shoup Company, Ltd., paper box manufacturers, recently, on the occasion of his marriage to a popular Toronto lady.

Copies of the *London Graphic,* just to hand, reveal that the widely known British illustrated weekly of May 23 was printed on Luxacoated Porcelain Book, the product of Alliance Paper Mills, head office Toronto.

A. J. Nadeau, a widely known paper manufacturer, has been appointed superintendent of the Lincoln mill of Alliance Paper Mills, Ltd., in succession to W. A. Woodroffe, who goes to the sales department. Mr. Nadeau has had wide experience in the making of rope and tag paper in which Alliance Mills specialize, and is loked upon as a valuable acquisition to the company's forces.

Holyoke Freight Service Speeded Up

[FROM OUR REGULAR CORRESPONDENT]

HOLYOKE, Mass., June 23, 1931.—The speeding up of the freight service on the Boston & Maine railroad brings Holyoke one day nearer to the midwest markets. Thursday night the first of the connecting express freights pulled out of here heavily loaded with paper and other merchandise for the Chicago markets. It connected at East Deerfield with the Hoosac flyer freight, making the run to Chicago in 48 hours instead of 72 hours.

Following are the time centers under the new express freight service under which Holyoke shipments will arrive at western points: Cincinnati midnight third day; St. Louis 4 A.M. third day; Indianapolis 6 P.M. second day; Toledo, 10:23 P.M. second day; Detroit, 10 A.M. second day; Cleveland, 10 A.M. second day.

Pulp and Paper Production in April

According to identical mill reports to the Statistical Department of the American Paper and Pulp Association from members and cooperating organizations, the daily average of total paper production in April increased 1 per cent over March, but was 10 per cent under April 1930. The daily average wod pulp production in April was 9 per cent above March, 1931 and 16 per cent under April, 1930.

Compared with April a year ago, the daily average production registered a decrease in the following grades: News print, uncoated book, paperboard, bag, wrapping, writing, hanging and building papers. Compared with March 1931, uncoated book, writing and hanging papers were the only grades whose daily average production showed a decrease. Total shipments of all major grades decreased 12 per cent during the first four months of 1931 as compared with the first four months of 1930.

Identical pulp mill reports for the first four months of 1931 indicated that the total pulp consumed by reporting mills was 18 per cent less than for the first four months of 1930, while total shipments to the open market during the first four months were 25 per cent below the total for the same period of 1930.

Pulp inventories showed a further decrease and at the end of April, total stocks of all grades of pulp were 23 per cent below the level of the preceding year. Bleached and easy bleaching sulphites, mitscherlich, kraft and soda pulps, all showed a decrease in tonnage.

REPORT OF PAPER OPERATIONS IN IDENTICAL MILLS FOR THE MONTH OF APRIL, 1931

Grade	Production Tons	Shipments Tons	Stocks on Hand End of Month—Tons
News Print	102,450	101,819	32,289
Book, Uncoated	77,277	78,518	46,029
Paperboard	163,417	162,409	63,323
Wrapping	45,985	46,333	43,951
Bag	11,715	12,632	6,099
Writing, etc.	25,961	26,487	49,967
Tissue	6,265	5,865	3,948
Hanging	3,164	2,963	4,182
Building	5,960	6,246	2,785
Other Grades	16,384	16,005	15,204
Total, All Grades April, 1931	458,578	459,277	269,777
March, 1931	452,581	451,225	268,903
February, 1931	419,021	419,604	268,074
January, 1931	445,193	443,749	268,810
January, 1931	170,937	157,324	15,105 68,597

REPORT OF WOOD PULP OPERATIONS IN IDENTICAL MILLS FOR THE MONTH OF APRIL, 1931

Grade	Production Tons	Used During Month—Tons	Shipped During Month—Tons	Stocks on Hand End of Month—Tons
Groundwood	88,685	74,108	1,886	60,535
Sulphite News Grade	29,403	27,192	1,563	5,301
Sulphite, Bleached	18,046	16,289	2,347	2,098
Sulphite Easy Bleaching	2,491	2,430	158	572
Sulphite Mitscherlich	3,597	2,597	1,093	1,396
Kraft Pulp	28,520	22,027	6,936	7,611
Soda Pulp	18,232	14,798	3,805	2,801
Pulp—Other Grades	449	364	58	382
Total, All Grades				
April, 1931	189,423	159,805	17,846	80,696
March, 1931	174,120	155,865	15,008	68,924
February, 1931	160,736	146,882	16,774	65,677

Finnish News Print Demand Declines

WASHINGTON, D. C., June 24, 1931—The situation in the Finnish news print market is rather uncertain due to recent changes in prices in the United States says a report from American Consul Bouchal, at Helsingfors. Buyers in the various markets refrain from purchasing more than will suffice for immediate requirements. In the thin printings market purchases have also declined in volume. Orders for greaseproof paper are flowing in satisfactorily, but here the price situation is not stable. Recent decisions to reduce prices, however, it is thought will improve sales.

The pulp market shows little change. Shipments of sulphite pulp have decreased while sulphate pulp has been in appreciable demand. In some instances the Norwegian strike has increased sales of groundwood.

Demand for Paper Improves In Philadelphia

Practically All Standard Grades of Fine Paper Exhibit Stronger Undertone—Coarse Paper Market More Active, With Quotations Showing Upward Trend—Parchment, Waxed and Gummed Papers In Better Request Than of Late

[FROM OUR REGULAR CORRESPONDENT]

PHILADELPHIA, Pa., June 22, 1931.—Mid June days were slightly better in the Philadelphia paper market with improved fine paper trading and upward trend in the wrapping paper division. Though the upward trend was not characteristic of what might be termed a normal market there was evidence that some attention is being given to stocking while prices are at the present levels as consumers now are convinced that there will be upward revision of values rather than downward marking in the coming months. With mill stocks at low levels and dealers fairly well cleaned out the Quaker City trade is prepared for fresh shipments of paper in the summer months.

Following a general advance in the price of gummed paper which reached 5 per cent in the current month, the trade is stocking more freely as there is growing demand for these specialties. Parchment and waxed papers are among the grades showing firmer prices altho the advances are not noteworthy. Wholesale prices of book paper are at the best of the current year though the markets show spottiness in orders of size. The day to day price gyrations which marked early spring have disappeared and consumers and mill representatives can now place orders with more assurance that prices will hold. Mill deliveries are firmer in all lines of fine papers. Tissues have advanced 10 per cent on white No. 2 grades, while manilas hold firmer. Cords of all description have advanced in the month but stocks bought at old prices still interfere with the steadier tone among local distributive branches. Most dealers are stocked for some time to come, so that cord manufacturers do not look for more advanced prices until the Fall.

To Organize Philadelphia Section of TAPPI

While initial steps in the formation of the Philadelphia Section of the Technical Association of the Pulp and Paper Industry were taken on June 12, when a dinner was arranged for that purpose at Shoyers, 412 Arch street, the actual organization will not be perfected until mid-September in time for the National TAPPI convention which is to be held in Kalamazoo, Mich., in late September.

The committee formed to organize and to assemble the membership in time for the first meeting, election of officers and appointment of delegates to the Convention, who were selected at the last June meeting here are the following: William M. Shoemaker, Jr., National Vulcanized Fibre Company, Yorklyn, Del., Dr. R. T. Von Hazinburg, Scott Paper Company, Chester Pa.,; Dr. H. C. Schwalbe, Dill & Collins Paper Company, Philadelphia, James Hazelwood, Barber Asphalt Company stationed at the Lang Paper Company, Gloucester, N. J.; Dr. G. E. Landt, Continental Diamond Fibre Company, Bridgeport, Pa.; and Harvey P. Cannon, technical superintendent of the Container Corporation of America, Manayunk plant, Philadelphia. Mr. Cannon was secretary in charge of the formation work which preceded the meeting this month and under whose auspices and that of the National TAPPI and Charles W. Rivise, chairman of the Patent Committee of the Technical Association, the meeting was held.

At the meeting there was a talk on organization work by Mr. Rivise, who unfolded the preliminary plans and then called on Secretary R. C. Macdonald, of the National TAPPI, who gave details of the activities and work conducted by his association, and laid down similar lines of endeavor for the local Section to be carried on in event of organization this fall. Dr. W. N. Greer of Leeds & Northrup Company, Philadelphia, gave a talk on hydrogen ion measurement.

The Philadelphia Section of the Technical Association of the Pulp and Paper Industry will be, when organized this fall, the fourth of these groups to be in operation throughout the country. There are three others already functioning, on the Pacific Coast, in Wisconsin, and in Michigan. The Philadelphia Section will continue in its membership representatives of every paper manufacturing and paper chemical concern in this territory, including Southern New Jersey, Eastern Pennsylvania, Delaware, Maryland, and the District of Columbia. The committee will work throughout the summer months in organization work and arranging for interesting and worthwhile programs for the fall and winter meetings.

Box Papers Moved By Hampden Glazed

Though the season is considered quiet by the majority of box paper supply houses, the Hampden Glazed Paper and Card Company, with offices in the Bourse Building, under management of J. A. Stuckey, has been able to round up a goodly share of business. There are many requests for samples and Glazed Chintz and Multi Colored Plaids, new designs, are in good demand. The new plaids are vivid shades on glazed antique background and of modish technique. All fancy grades of box covers made by the firm show steady demands, despite general conditions.

Paper Mills Improving Power

With the growing use of electricity and the experiences of recent drought inconveniences fresh in mind the tendency of paper manufacturers is to improve power equipment and provide against similar drought nuisances by addition of electrical equipment. The speedy requirements of the day also necessitate that power equipment be kept up-to-date in order that the mills be in position to handle orders with dispatch. Among the mills recently installing latest General Electric units are the following:—

Jessup & Moore Adds Turbine

The Jessup and Moore Paper Company has added to its Delaware mills, Wilmington, Del., a new variable speed mechanical turbine for operation on its paper machine. The new unit replaces the reciprocating engine.

Hinde & Dauche Improve Drives

There has just been provided for the Gloucester, N. J., mills of the Hinde and Dauch Paper Company, a single motor paper machine drive of the General Electric type. This will be used in remodeling the paper machine in the board mills.

Lindsay Paper Co. Starts Summer Drive

Realizing that it requires concentrated sales energy to promote business in times like the present, the Lindsay

Paper Company, 804 Sansom street, is planning to apply the pulmotor to its paper promotion work. Under the able guidance of Carl Bellas, who has been conducting a series of sales campaigns on various lines handled by the Lindsay company, there will be continued into the summer months of intensive drive to acquaint the users and consumers of paper more thoroughly with the Lindsay lines of fine papers. There will be put into effect new plans among the staff of workers which will effectively boost the duller months records. The Lindsay company has added a new index paper called the 804 Index in white and sixteen colors which it has just acquired and which is proving successful in initial sales.

Meunier Made Vice President of Keickhefer Container

L. J. Meunier, formerly general manager for the plants of the Keickhefer Container Company, and devoting his attention to the mills and plant at Delair, N. J., and Three Rivers, Mich., has just been promoted and elected to the vice-presidency of the company. He will be vice-president in charge of manufacture of all plants.

G. W. Ward At Advertisers Meeting

George W. Ward, head of the D. L. Ward Company, terminal Commerce Building, attended the meeting of the Advertising Federation of America held in New York at the Hotel Pennsylvania June 16. He was accompanied by William R. Ewald, vice president of the Ward company and president of the Advertising Federation of America. The meeting was devoted to topics of interest to advertisers in the direct mail, newspaper, magazine and radio advertising fields.

Paper Trade Bowlers In Champion Play

The winner of the championship cup for the Philadelphia Paper Trade Bowling League was the Whiting Paper Company, which won first place in the games in the final play held at the Recreation Alleys. The J. R. Howarth Paper Company stood second. The league has been engaged in a series of games played throughout the winter months and the cup award was made for the championship for 1930-31. James Lyon, of the Whiting Paper Company, Philadelphia branch, was captain of the victorious team.

Kalamazoo Vegetable Parchment Co. Adds New Line

Philadelphia paper dealers have been introduced to an entirely new line of paper manufactured by the Kalamazoo Vegetable Parchment Company in the way of second sheets made of cotton linters. The line is popularly priced and comes in white and colors.

National Waterproofing Co. Adds New Butcher Paper

There has been developed in the way of waxed white papers useful for the butcher and delicatessen trades a new line made by the National Waterproofing Company, with plant in Camden, N. J., and offices in the Drexel Building. The new line will augument the various specialties made in the way of waterproof products by the National company. It is similar to parchment in appearance.

I. O. Van Duzer Dead

Word has just been received of the death of Issac O. Van Duzer. He died of pneumonia in the first week of June at the age of seventy-nine. He is survived by his wife, a son and a daughter.

Mr. Van Duzer had been active in the affairs of Louis Dejonge & Co. for many years. He retired from active work on January first of this year and had been enjoying good health until recently. An attack of pneumonia found him without the necessary strength.

Boston Paper Trade Happenings

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., June 22, 1931.—A sales meeting was held at the office of Carter Rice & Co. Corp., Saturday morning, in regard to changes in the prices of writing paper lines of the Hammermill Paper Company and the adoption of carton packing for these papers.

Arthur W. Blackman, head of D. F. Munroe Company, described his trip to the Pacific Coast in connection with the business of the National Paper Trade Association of the United States, at a sales meeting of the company Saturday morning. Mr. Blackman is president of the association. Floyd H. Blackman, sales manager, presided.

General business was discussed at a sales meeting of the Storrs & Bement Company, Saturday morning, at which William N. Stetson, Jr., president, and John H. Brewer, general manager, presided.

The June number of "How," published by Tileston & Hollingsworth Company, and edited by A. V. Howland, contains snappy articles of admonition and information to the printer and analyses of the June sheet of the T. & H. calendar. The issue is printed on Crinoline laid antique Gray, with Crinoline cover, gray.

John Carter & Co., Inc., have taken the selling agency for Patten Mimeo-Bond, made at Appleton, Wis.

Arthur C. Hall, treasurer and manager of John Carter & Co., Inc., has gone to his summer residence at Connecticut Lake, N. H.

George E. Roberts, field manager of the Standard Envelope Manufacturing Company, Cleveland, Ohio, has been calling on the printers, showing some interesting uses of the Silvertone line of envelopes, which are carried by the Arnold-Roberts Company.

Blair B. Stringfellow, New England district manager of the Albemarle Paper Manufacturing Company, Richmond, Va., has returned to the Boston offices from that city, where he has been recuperating after an operation. John R. Diggs, vice-president of the company, who was at the Boston office most of last week, returned to Richmond Saturday.

Among New England men to attend the Mill & Merchants' Convention of the Strathmore Paper Company, were the following: Arnold-Roberts Company—Royden Loring, A. J. Campbell, E. P. Clausmever, E. R. Wright and W. F. Corregan, of Boston; R. H. Gay, Providence, R. I.; N. M. Morse, Springfield, Mass., and H. M. Alling, New Haven, Conn. Carter Rice & Co. Corp.—Charles A. Esty, managing director; E. A. Crowell, merchandising manager; John F. Wilson, advertising manager, and Frank H. Winter, sales manager. Cook-Vivian Company—John W. Vivian, president, and W. Edwin Porter, secretary. Storrs & Bement Company—William N. Stetson, Jr., president; John H. Brewer, general manager, Boston; Mr. Cummings, Providence, and George Webb, New Haven.

Schedules in bankruptcy of Joseph Acciaioli, d.b.a., North End Paper Company, Providence, R. I., have been filed, showing liabilities of $20,284 and no assets.

Japanese Visitor at Holyoke Mills

[FROM OUR REGULAR CORRESPONDENT]

HOLYOKE, Mass., June 23, 1931.—Allamaru Shiraish, chief engineer of the Japanese Government's paper mill at Tokyo, Japan, visited Holyoke mills Wednesday of last week, particularly at the mills of the American Writing Paper Company Inc. He expressed himself as highly pleased and interested with the advanced methods shown here in paper making.

Activities of Fox River Valley Paper Mills

Peavey Printing & Paper Co., of Ashland, Wis., Adds Converting Machine for Manufacture of Rolled and Interfolded Paper Towels—Federal Forestry Department Endeavoring to Insure Adequate Forest Fire Protection for Wisconsin

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., June 22, 1931—Addition of a converting machine for the manufacture of rolled and interfolded paper towels has been completed by the Peavey Printing and Paper Company, Ashland, Wis. The machine is valued at $2,500 and has a capacity of 25,000 paper towels per hour. The company also manufacturers a line of napkins and tissue. Three more employees will be added to take care of the increased output, according to W. A. Peavey, general manager.

James R. Simpson Resigns

James R. Simpson has resigned as manager of the main mill of the Consolidated Water Power and Paper Company, Wisconsin Rapids, Wis., according to announcement made last week. He is to become production manager of the Eastern Division of the Southern Kraft Corporation, with headquarters at Mobile, Ala. He will take charge of production in mills at Mobile, Panama City, Fla., and Moss Point, Miss., and will assume his new duties August 1. Mr. Simpson came to the Consolidated in 1921 from the Great Northern Paper Company, Millinocket, Maine, and gained rapid promotions until he was made mill manager three years ago.

Higher Forestry Tax for Fire Fighting

Six-hundred miles of road costing $750,000 must be built in the national forests in Wisconsin in order to insure adequate fire protection, it was found by G. H. Lautz, road engineer of the federal forestry department, who is in the state making a survey. He was accompanied to Wisconsin by C. M. Granger, director of the national survey to determine the amount of available timber, the rate of depletion and the rate of growth. These men have been conferring with E. W. Tinker, forester in charge of the Great Lakes district.

Two new laws, one of which has had final passage, will help to solve Wisconsin's problem of dwindling timber supply. One raises a forestry tax of $300,000 annually to be used for fire fighting. This has passed the state assembly. The other requires companies cutting timber to dispose of all slash within 50 feet of highways or railroads, building or other stands of timber, and to clear wide lanes in each section of land for fire breaks. Permits must be obtained to burn slash. It was found impracticable to force logging companies to dispose of slash completely. The law therefore stipulates removal of only the slash which is exposed to fire danger, especially when located in the most frequented places. This law has had final passage. It provides that slash must be removed within one year, and gives the conservation commission power to do the work if lumber companies and others fail to do it, the costs to be assessed against the owners.

A study of slash and its status as a fire menace has been made by Raphael Zon, head of the Lake States Forest Experiment station, and the findings are published in a phamphlet. Slash from one to five years old covers an area of about 540,000 acres in northern Wisconsin, and there is 100,000 acres of older slash, the report shows. About ten per cent of it is from pulp wood, and most of it nowadays is from hardwood. It increases at the rate of about 100,000 acres a year and the supply is at its greatest now. The remaining old virgin timber in Wisconsin covers only 400,000 acres and in a few years it will be concentrated in the hands of a few operators who have a supply for the next 15 or 20 years. This reduction of logging helps conditions it is pointed out, because of the ease of regulation. In some cases the slash amounts to the equivalent of 40 cords to the acre, showing the intensity of forest fires once they gain headway.

Consolidated's Fine Safety Record

It is now nearly sixteen months since the Interlake Pulp and Paper Company, Appleton, Wis., branch of the Consolidated Water Power and Paper Company had a lost time accident. The last accident on record was February 16, 1930, and the mill has been commended highly for attaining its present goal. The Consolidated's mill at Stevens Point, Wis., also is building up a record and will end a year of perfect safety on August 3, 1931 if no accident happens. The Biron mill has operated successfully since January 10, 1931. The main Consolidated mill at Wisconsin Rapids had two month to its credit but must start all over again because of a lost time accident this month. The wood room of the Interlake mills, with its numerous hazards, holds a high record for safety. It has not had an accident since March 14, 1929. The electrical department has a smaller force but boasts a perfect record since August 29, 1923.

News of the Industry

Indemnity is being sought against the Consolidated Water Power and Paper Company, by the Federal Land Bank, of St. Paul, Minn. The bank claims damages because of lands along the Wisconsin River being flooded by the company's dam at Biron. The bank seeks to force the paper mill to condemn and pay for lands so used. The case was heard in court at Stevens Point, Wis., and a decision is expected shortly.

A load of Swedish pulp consisting of 1,000 tons arrived in Milwaukee, Wis., last week, direct from a pulp mill near Stockholm for the Hummel & Downing Company. The shipment came aboard the Norwegian tramp steamer *Bill*, which found its way across the Atlantic and through the Great Lakes to the Milwaukee port. It took slightly over a month to make the journey. The steamer will take a cargo of copper ingots from Houghton, Mich., to Sweden on its return journey.

The Kimberly-Clark Corporation, Neenah, Wis., was successful recently in recovering nearly half a ton of brass screen stolen from its Lakeview mill. The thieves were apprehended and prosecuted.

George S. Gaylord, one of the chief executives of the Carton Division of the Marathon Paper Mills Company, Menasha, Wis., has begun erection of a new home at Neenah, Wis. The cost will exceed $25,000.

Gov. Philip F. LaFollette, of Wisconsin, was the recent guest of F. J. Sensenbrenner, president of the Kimberly-Clark Corporation, Neenah, Wis. The governor remained overnight at Mr. Sensenbrenner's country estate on Lake

Winnebago, after participating in the corner stone and graduation ceremonies of the Institute of Paper Chemistry of Lawrence College, Appleton, Wis.

M. A. Wertheimer, president of the Thilmany Pulp and Paper Company, Kaukauna, Wis., returned recently from a trip to Europe. He spoke before the Rotary Club of Kaukauna, giving some of his observations of business abroad.

George W. Mead, president of the Consolidated Water Power and Paper Company, Wisconsin Rapids, Wis., was elected president last week of the Wisconsin League of Municipalities. He was one of the principal speakers at the league convention. Mr. Mead is mayor of his home city and now heads the state organization made up of city officials.

Otsego To Observe Centennial

[FROM OUR REGULAR CORRESPONDENT]

Kalamazoo, Mich., June 22, 1931.—Otsego, often times honored with the title of America's "biggest little paper mill center," observes its first centennial July 2, 3 and 4. It is hoped at that time to pay suitable tribute to the industry that has been such an important factor in its growth and development.

Samuel A. Simpson, vice president of the MacSimBar Paper Company, and one of those men of the first importance in the development of the paper industry in the Kalamazoo river valley district, has been named chairman to arrange a program for the papermakers of many years ago, particularly to invite all papermakers who in years past have lived in Otsego and moved away, to come back and renew acquaintances. Letters to that effect are going forward and a generous response is anticipated.

It was away in 1887, or 44 years ago that George E. Bardeen, then secretary of the Kalamazoo Paper Company, under the tutalage of his step-father, Samuel A. Gibson, resigned from the concern in Kalamazoo and organized the Bardeen Paper Company, Otsego, where there was some water power from the Kalamazoo river, was selected as the site for the new industry. Mill No. 1 was erected on the northeast bank of the river and was soon distinguished as a gold mine.

Associated with Bardeen were such men as Frank H. Milham, Noah Bryant, Charles Russell, Walter Hodges and John F. King, all destined to make a name for themselves in the paper trade, though as heads of other concerns in the valley.

Only a few years after the first Bardeen mill was built, mill No. 2 was erected just across the river, giving that concern three machines. Things breezed along for the interests and in 1909 Otsego stepped out with the announcement that three new concerns had been organized and as many mills would be erected. These were the MacSimBar Paper Company, still in operation and under the management of Charles E. Nelson, onetime president of the Eddy Paper Company; the Babcock Tissue Paper Company and the Parafin Paper Company. The last two named were absorbed by the Wolverine Paper Company, whose affairs were wound up several years ago, quite disastrously for all stockholders.

Bardeen needed a coating plant and this led to another expansion step in the organization of the Otsego Coated Paper Company. This company erected its coating mill near the MacSimBar mill and it is still in operation.

With the passing of George E. Bardeen, capitalistic interests formed a giant combine, known as the Allied Paper Mills, which absorbed the Bardeen Paper Company in Otsego together with the King Paper Company and the Monarch Paper Company in Kalamazoo. Alex. G. Gilman is president of Allied, with Dwight R. Curtenius, recently appointed general manager. The No. 2 Bardeen mill has been closed, but the original No. 1 mill still operates on a satisfactory basis, having always been maintained at a high point of efficiency.

During the past decade over $1,000,000 have been expended on the MacSimBar mills, practically doubling its capacity, adding a new power house and developing a beautiful northside park.

B. Hopper to Play on U. S. Team

KALAMAZOO, Mich., June 22, 1931.—Bertrand Hopper of this city will be a member of the United States senior golf team which will compete with the British team for the Lord Derby cup at the Swinley Forests links, near Sunningdale, England, July 15-16. Mr. Hopper is president of the Hopper Paper Company of Taylorville, Ill.

The Kalamazoo player accompanied by his daughter, Helen, leave for London on the Bremen, June 30.

The two teams which will compete for the cup are made up of senior golfers, over 50 years of age, from the different state organizations. The local man was one of the founders of the Michigan association and at one time held the senior championship of Michigan. Play will consist of 18 hole foursomes on the first day and singles matches on the final teams visited America.

The United States players will be guests at a dinner in London given by the British Golfing society which will be attended by the Prince of Wales. The Americans, also, will take part in the annual tournament of the British society at Stoke Poges, July 21-22. The visiting players also will have an opportunity to play the noted courses of England and Scotland including St. Andrew's.

Hotel Carlton, London, will be the headquarters of the American team. Several of the players from this country including Joshua Crane, already are there. Frederick Snare, New York, has been selected captain of the Yankee Seniors. Other players beside Mr. Hopper, who will represent the United States in the international matches are, John W. Faison, Jerome Peck, Frederick H. Ecker, Herbert L. Pratt, Findlay S. Douglas, Dr. W. S. Adams, Alexander P. Gray, S. Cliffton Mabon, Harry W. Croft, O. B. Hollingsworth and Frank J. Helme. They come from all sections of the U. S. A.

The Kalamazoo representative is one of the best known and most enthusiastic golfers in America. He had much to do with the securing of two municipal golf courses for this city. He is a member of the Kalamazoo Country club, Gull lake country club, Battle Creek country club, as well as several others.

Japanese Paper Production

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., June 24, 1931—Production of mills of the Japanese Paper Manufacturers' Association during the month of March was announced at 54,093 short tons and sales at 55,852 tons, bringing the totals for the three months period up to 164,787 tons and 169,785 tons respectively according to a report from Trade Commissioner Steintorff, at Tokyo.

More than half of the output consisted of printing papers, news print accounting for 20,969 tons and other printing papers for 11,869 tons. The mills also produced 20,220 tons of chemical pulp and 15,888 tons of mechanical pulp. Consumption of pulpwood and other raw stocks during March was reported at 4,677,830 cubic feet of wood, 908 tons of rags, 990 tons of straw, and 2,401 tons of waste paper.

Canadian Technical Section Meets In Montreal

Discussion of Experiments Carried Out By Dr. J. H. Ross and Colleagues In Alkaline Cooking, At Pulp and Paper Laboratory, Arouses Great Interest—H. W. Johnson, of Laboratory Staff, Gives Resumé of Ground Wood Studies

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, Que., June 22, 1931.—The annual summer meeting of the Technical Section of the Canadian Pulp and Paper Association was held in Montreal during the week, about 50 members attending.

At the afternoon session, H. Wyalt Johnson, one of the work done in the Pulp and Paper Laboratory here in experimenting on alkaline cooking of pulp. This brought out the fact that while pulp makers had for years been looking for the promised higher production by the use of the sulphite process, they were still not getting more than 50 per cent yield, and that as the only place where real money could be saved in the industry was in increasing the yield, the experiments now being carried out by Dr. J. H. Ross and his colleagues at the laboratory in alkaline cooking were of exceptional interest to all engaged in the pulp industry.

At the afternoon session. Wyalt Johnson, one of the laboratory staff, gave a resume of the experiments carried out in ground wood studies, following a program defined by a special committee of the Association. A great number of tests have been made during the present year having as their object the improvement in grinding operations and the reduction in the cost of production, and while the experiments are far from complete the members present were enthused at the progress made.

This discussion was followed by one regarding the deterioration in pulp wood, through fungi and other causes, and the tests made to find some preventative of what was described as a tremendous annual loss in piled wood through decay. Indication was given of the compilation of a pulpwood manual which would contain information as to the various species of timber commonly used for pulpwood, hints on cruising and measurements in the woods and at the mill, and intimate details of the whole pulp industry.

This work is in the hands of the Pulpwood Valuation Committee, and was outlined by R. W. Sterns of the Abitibi Pulp and Paper Company while addresses were given by Ellwood Wilson and M. Koroleff on the subject of deterioration.

At a dinner in the Ritz-Carlton Hotel in the evening, Arthur Dawe, general manager of the St. Maurice Valley Paper Corporation, presented the Weldon Gold medal to G. P. Genberg of Edmunston, N. B., for having contributed the best paper at the annual meeting of the Technical Section last January. Mr. Dawe is the donor of the medal which, following out the suggestion made by the late Edward Besk, was given for the encouragement of new ideas in the paper industry, and it was named in honor of the late I. H. Weldon, president of the Provincial Paper Mills, who was himself an enthusiast in the searching for new ideas of benefit to the industry.

Mr. Dawe declared that in the past fourteen years the technical men of the industry had placed Canada in a position of leadership and that their problem from now on was to obtain cheapness of production while retaining quality of product.

The future of the pulp and paper industry lies in the hands of the technical man, he said, and while certain financial arrangements have placed the industry in somewhat serious difficulties at present, it is to the technical men that the leaders are looking to rectify conditions.

St. Lawrence Corp. Defers Dividend

A feature of the week has been the announcement that the current quarterly dividends would be deferred to the Class A shareholders of St. Lawrence Corporation. Ltd., the preferred shareholders of St. Lawrence Paper Mills Company, Ltd., and the common shareholders of Brompton Pulp and Paper Company, Ltd.

Letters making this announcement indicate that the deferment of dividends is a matter of caution which is considered to be in the best interests of the companies concerned until, the immediate future of the news print industry can be more accurately predicted.

The difficult and unsettled conditions which exist throughout the industry are attributed to lack of demand for news print combined with lower price but, the letters state, constructive efforts are being undertaken to effect better co-operation between news print companies and the outlook for stabilization is better now than for some time past.

The letters indicate that St. Lawrence Corporation and its constituent companies occupy a relatively favorable position and express the opinion of the directors that operations for the first five months of the year have been satisfactory, in view of existing conditions, and that any moderate improvement in the news print situation should result in much better earnings.

So far as St. Lawrence Corporation and its constituent companies are concerned, the letters state that close coordination and consequent material economies in operating have been accomplished, while the individual identities of these companies, both financial and operating, have at the same time been strictly maintained. The constituent companies are St. Lawrence Paper Mills Company, Ltd., Brompton Pulp and Paper Company, Ltd., and Lake St. John Power and Paper Company, and in each case the directors report that properties have been maintained in splendid condition and that the three companies have a strong current position.

Sir Wilfred Grenfell Opposes Labrador Sale

Sir Wilfred Grenfell, the well-known Labrador medical missionary, in an interview at Halifax, N. S., on his way to New York, reiterated his opposition to the sale of Labrador by New Foundland, Saying it would be a "regrettable error." Experts were needed to develop Labrador and Newfoundland, he said, and he had great respect for the potential wealth of the latter territory.

The general economic depression had hit Newfoundland hard and prices of fish and fur were very low, said Sir Wilfred Fishermen were experiencing difficulty in getting advances or loans.

Dr. Grenfell will conduct an aerial survey of the coast of Northern Labrador this summer for the purpose of aiding navigation north of the Strait of Belle Isle.

Dr. Alexander Forber, head of the expedition, is a scientist of Harvard University and chief of the Department of Physiology.

Outlook For Paper Trade Better In Chicago

Early Resumption of Activities In Autumn Confidently Predicted By Representatives of Prominent Paper Houses—Current Price Adjustments Expected to Stabilize Market for Fall Turn—Kraft Paper Continues Fairly Steady

[FROM OUR REGULAR CORRESPONDENT]

CHICAGO, Ill., June 22, 1931.—The prospects for summer business in Chicago are reported to be better, seasonally, than for several years past and paper representatives are rather confidently looking for an early resumption of activity in the Fall. Price adjustments being made today are expected to stabilize the market for the Fall turn and encourage buyers who have been holding back to step in and buy. The fine paper market has been in the throes of a price adjustment and a rather chaotic condition exists and will probably continue to exist until the turn has been completed. The kraft market continues to hold firm and, even at the low price, this condition is cheering to kraft merchants who have worked tirelessly to maintain some sort of stabilization. The book and cover markets remain about the same as last week while in the board industry there is quite a bit of evidence showing that, despite an unfavorable year the market did well in comparison with some other lines. The ground work for good Fall business is said to have been laid. News print remains unchanged. The waste paper market is reported to be unusually quiet—a plentiful supply being on hand at this time.

Paper Salesmen Hold Golf Tourney

Thirty members of the Middle West Division of the Salesmen's Association of the Paper Industry, and their guests, toiled manfully in a 95 degree sweltering sun on June 19 at the Long Beach Country Club, Michigan City, Indiana, to complete the second of their monthly series of golf tournaments which run throughout the summer. The day was a "scorcher" but the day's outing was a huge success with two rounds of golf, a fine luncheon and an equally excellent dinner to make everybody happy. On top of that Harold Knott, of the Eastern Manufacturing Company, president of the association, won the blind bogey prize—and that made the day complete.

While Henry Johnson, of the Brown Company, had only a part of the prize winners figured out at this writing, the list is big enough to make news for the paper selling public. Low net was won by George Ross, a guest. The low net foursome was composed of Tom Willis, of Willis & Weber, Kansas City; J. R. Russell, of the Marathon Paper Mills; Ernie Brown, of Lawrence Bag, Middletown, and his son, Ed. M. Brown. The low putt foursome was composed of Ed Babel, of Marquette Paper; and his three holes was taken care of by Warren Moore, of the Brown Company; while Henry Johnson, chairman of the golf committee, won the prize for the least number of putts over 18 holes.

Waste Paper Institute to Meet

According to M. J. Pushker, of the Cook County Paper Stock Company, there is a strong possibility that an important meeting of the Waste Paper Institute will be held in Chicago shortly after the July meeting of the Paperboard Industries Association. Mr. Pushker, an officer of the newly formed Institute designed to promote that industry and to bring each allied branch into close coordination, states that the paper board group has a committee actively working with a group from the waste paper organization along lines that will prove beneficial to both groups. The activity is designed to promte a better and more profitable business relationship between individual members of the two groups and of the two industries as a whole.

News of the Trade

M. C. (Pete) Crawford, representative of the Pratt Paper Company, of Des Moines, Iowa, was in Chicago this week visiting a number of Chicago paper offices. He reports conditions in the Iowa market slowly taking a turn for the better.

Examples of the way Peacock Dull Finish Folding Enamel takes water color printing are contained in the most recent direct mail advertising describing this line sent out by Bermingham & Prosser. The copy mentions the growing vogue for water color printing and explains why the Peacock Enamel is suited for this purpose. Illustrations bear out the copy theme in forceful manner. Peacock Enamel comes in white, ivory and india—all sizes and weights.

Westvaco Inspirations for Printers, No. 66, published by the West Virginia Pulp and Paper Company, strikes a most interesting note with a short essay on "Lithography Romantizue, 1840." The cover illustration is fascinating, with the use of the old style type and of an old scene, lending quite a bit of interest. The essay discusses the history of Alois Senefelder, first of a series of artists who, in the 19th century, began to use lithography as a medium. Westvaco No. 66 also contains articles on "The Pageant of Motor Car Illustration," "Twists of the Unusual" and an interesting discussion of home and furniture advertising under the head of "A Little Journey through the House." As usual, the book is replete with splendidly executed illustrations admirably adding to the text value.

The second of that clever series from Hollingsworth & Whitney on "Basic Fables," sent through two Chicago distributors, Dwight Bros. and Whitaker Paper Company, reached the Chicago trade this week. It was headed "The Widow With Unique Ideas on Profit." The copy talks interestingly about the widow who, trying to get the hen to lay two eggs, doubled its barley ration and, instead of more eggs, found a lazy hen that would lay no eggs. The more serious copy talks about the peril of paying too much for the need and getting too little for the cost. And ends up with an interesting story on Hollingsworth Basic Bond. It's the kind of a story, printed on buff bond, substance 20, with two or three striking illustrations that merits—and gets—attention.

Now Kelley Paper Co.

[FROM OUR REGULAR CORRESPONDENT]

BELLOWS FALLS, Vt., June 22, 1931.—Frederick H. Babbitt of the Babbitt-Kelley Paper Company has sold his interest in the property and business to Herbert T. Kelley. Previously the two controlled the business and Mr. Babbitt now retires. The name has been changed to the Kelley Paper Company. Erwin W. Kelley, son of Herbert T. Kelley, is now president, another son, Harold F. Kelley, secretary, and Herbert T. Kelley treasurer and general manager.

Canadian Paper Export Increase

Canadian exports of pulp and paper were valued at $12,786,114 according to the report issued by the Canadian Pulp and Paper Association. This is an increase of $2,014,662 over the previous month.

Wood-pulp exports for the month were valued at $2,428,245 and exports of paper at $10,357,869 as compared with $2,168,682 and $8,602,770 respectively in the month of April.

Details for the various grades of pulp and paper are as follows:

	May, 1931		May, 1930	
	Tons	$	Tons	$
PULP:				
Mechanical	9,796	257,532	15,660	460,905
Sulphite Bld.	21,653	1,350,863	19,024	1,355,194
Sulphite Unbld.	12,049	507,005	18,266	905,509
Sulphate	4,271	268,903	8,297	514,371
Screenings	1,367	22,602	1,577	29,705
All Other	414	21,340	392	22,791
	49,550	2,428,245	63,216	3,288,475
PAPER:				
News print	185,432	10,006,387	225,251	12,951,471
Wrapping	1,025	88,133	1,400	144,186
Books (cwts.)	2,870	23,940	3,019	26,915
Writing (cwts.)	62	385	315	2,892
All Other	.....	239,024	.....	311,142
	.....	10,357,869	.....	13,436,606

For the first five months of the year the exports of pulp and paper were valued at $60,788,339. In the corresponding months of 1930 the value was 76,644,844 so that there has been a decrease this year of $15,856,505.

Details for the various grades are given below:

	5 Mos., 1931		5 Mos., 1930	
	Tons	$	Tons	$
PULP:				
Mechanical	62,965	1,852,494	78,617	2,313,356
Sulphite Bld.	98,702	6,404,456	116,270	8,604,461
Sulphite Unbld.	57,897	2,534,072	88,654	4,409,971
Sulphate	27,764	1,788,539	44,115	2,551,812
All Other	8,480	214,325	11,205	235,246
	255,808	12,793,886	338,861	18,114,846
PAPER:				
News print	835,935	46,264,637	973,282	56,098,107
Wrapping	4,738	438,953	6,396	671,596
Book (cwts.)	10,290	88,086	17,397	162,572
Writing (cwts.)	1,300	12,003	1,068	9,805
All Other	.....	1,190,774	.....	1,587,918
	.....	47,994,453	.....	58,529,998

Pulpwood exports for the first five months of this year were 311,237 cords valued at $2,809,151 as compared with 510,347 cords valued at $4,780,208 in the corresponding months of last year.

L. H. Kunhardt Heads Paper Mill Mutual

At a meeting of the directors of the Paper Mill Mutual Insurance Company held recently in Boston, D. W. Lane tendered his resignation as president and L. Henry Kunhardt was elected to succeed him. Mr. Lane becomes president emeritus.

The Paper Mill Mutual Insurance Company was originally organized in 1887 by Edward Atkinson, then president of the Boston Manufacturers Mutual Fire Insurance Company, together with George Wheelwright, Charles T. Crocker, Byron Weston, Charles A. Dean, Mortimer B. Mason, A. L. Hollingsworth, and others, the object of the company being to fill the need at that time for adequate insurance on paper mills at reasonable rates.

Starting with a group of less than forty or fifty mills, the company has grown steadily until the amount of insurance in force now totals $100,000,000, covering a wide range of manufacturing property, of which only 18 per cent is now on paper mills. The average cost of its insurance has been brought down to 3.54 cents per hundred.

Mr. Lane retires from the management of the company after forty-two years of successful service. He was first elected assistant secretary and assistant treasurer in 1889, secretary and treasurer in 1894, vice president in 1912, and president in 1920. Mr. Lane has recently retired from the presidency of the Mutual Boiler Insurance Company. In this work he was one of the pioneers in the development of useful and efficient inspection of boilers and power plants, and his efforts in building up the complete service now provided has proved of unusual benefit in preventing losses.

Mr. Kunhardt, the new president of the Paper Mill Mutual Company, is also president of the Boston Manufacturers Mutual Fire Insurance Company, the largest company in the factory mutual system. He has had long experience in engineering, fire prevention and fire protection work, and is today recognized as one of the leading experts in this field of service all over this country and in Canada.

Boston Paper Market Fairly Active

BOSTON, Mass., June 22, 1931.—General lines of paper are moving in fair amounts, considering the season of the year, with wholesalers hopeful for favorable business in the Fall, particularly in view of a gradual improvement in conditions, though slow. The market for sulphite grades for printing and letter-head purposes is reported as moderately good. Writing paper is holding its own. Envelopes are in average demand.

Wrapping paper demand has slackened somewhat during June, compared with the May activity, but textile papers and textile specialties are moving well, with the betterment in the cotton, woolen and kindred industries. Dealers in goods for summer requirements have been receiving a good volume of orders for drinking cups, and other paper-made supplies from shore resorts, parks, etc.

There is a slight improvement in the volume of box board orders in some quarters over the previous week. This market generally is maintaining its position, with values unchanged since the recent reductions. The paper stock market continues dull. Quotations are unchanged, but if anything the tendency is downward, particularly in books and magazines. Dealers say the twine business is fair all along the line.

Employees Get Compensation Awards

[FROM OUR REGULAR CORRESPONDENT]

CARTHAGE, N. Y., June 22, 1931.—A number of injured paper mill workers benefit from awards given by Referee James P. Richardson at a recent session in Compensation court. The awards were as follows: Leigh Steinbarge, an employe of the St. Regis Paper Company, $297.12 and John Beaubien, of the Racquette River Paper Company $10.77 weekly from January 24 to February 16. In the case of Don Robinson, an employee of the Norfolk mill of the St. Regis Paper Company, it was decided that there was no cause for action and the case was closed.

At a session in Glens Falls presided over by Referee Robert J. Cooper the following awards were allowed: Gordon Derby, International Paper Company, Fort Edward, $4,000; Thomas McGee, International Paper Company Fort Edward, $1,372.47; Jean B. Beaudet, Finch, Pruyn & Co., Newcomb, $12.83; William Ingalls Sandy Hill Iron and Brass Works, Hudson Falls, $10.84. The largest award to Gordon Derby was for injuries sustained in 1929 and when the case was called a representative of the paper company announced that an agreement had been reached whereby the injured man will receive $4,000 in addition to compensation already paid over a period of nearly two years. Examining physicians reported that Derby is suffering from a heart ailment which will not permit strain.

A strong Selling Point

Other factors being equal, the paper that's *cleanest* gets the order. These days, the cleanest papers are Centrifined.

Let us show you how other mills making your grades are increasing sales, making savings with Bird Centrifiners.

BIRD MACHINE COMPANY **SOUTH WALPOLE, MASSACHUSETTS**

manufacturers of the Bird Centrifiner under license from the Centrifugal Engineering & Patents Corp., owners of the Erkensator Patents.

BIRD CENTRIFINERS

4919

New York Trade Jottings

Scott Paper Company has applied to the New York Stock Exchange for additional listing of 3,246 shares of capital stock without nominal or par value.

* * *

Application for listing of 199,500 shares of common stock of the Lily-Tulip Cup Corporation, without nominal or par value, is pending before the committee on stock list of the New York Stock Exchange.

* * *

West Virginia Pulp and Paper Company, of 230 Park Avenue, New York, has declared a quarterly dividend of 40 cents per share, placing its common stock on a $1.60 annual basis, compared with 50 cents quarterly, or $2 annually previously paid.

* * *

Royal S. Kellogg, secretary of the News Print Service Bureau, with headquarters at 342 Madison Avenue, New York, attended the Summer Meeting of the Technical Section of the Canadian Pulp and Paper Association, at Montreal, Que., last week.

* * *

W. L. Jones, Inc., paper and twine merchants, of 96 Prince street, New York, have received a contract from the Post Office Department in Washington, D. C., for 350,000 pounds of kraft paper, and also an additional order from the Quartermaster's Department for 50,000 pounds.

* * *

A. A. Hormel, for several years associated with George F. Hardy, consulting engineer, of 305 Broadway, New York, and for the past two years with the Fidalgo Drying Systems, Inc., has just become associated with the Improved Paper Machinery Corporation, of Nashua, N. H., as sales representative.

* * *

American Writing Paper Company has appointed the Forest Paper Company, of 334 Hudson street, New York, as agents for the following Eagle A Products: Herculean Cover, American Embossed Cover, American Rope Bristol, American Standard Cover, American Super Book, Arven Folding Cover, Agawam Index, American English Finish Book, Riverdale Cover, Beebe Offset, Chester Offset, Dickinson Offset, Glendale Vellum, and Albion Ectype.

May Rebuild Dam at Fort Edward

[FROM OUR REGULAR CORRESPONDENT]

FORT EDWARD, N. Y., June 22, 1931—Rumors are rampant relative to the rebuilding of the present dam across the Hudson River here by the International Paper Company which are strengthened by the fact that surveyors have been busy in this section for some time. It is said that the surveys are being made with a view to separating the power holdings from those of the paper industry. The old dam was recently repaired and activities were suspended for several days while the work was rushed to completion.

William H. Bond Retires

[FROM OUR REGULAR CORRESPONDENT]

HOLYOKE, Mass., June 23, 1931.—William H. Bond Vice President of the American Tissue Mills Inc., and for 40 years connected in one capacity or another with that concern has retired from active service. Mr. and Mrs. Bond are spending the summer at Black Point, Conn.

Mr. Bond was born in Holyoke 62 years ago and became connected with the company when young. For many years he was a close personal friend of the late J. Louis Perkins, founder of the Company.

New Trial Directed in Pulpwood Case

[FROM OUR REGULAR CORRESPONDENT]

AUSABLE FORKS, N. Y., June 22, 1931—Under a court decision rendered this week by Supreme Court Justice Christopher J. Heffernan a new trial is directed in the action of Thomas B. Cotter, surviving partner in the Keene Lumber Company, against the J. & J. Rogers Company, of this place. Considerable interest has been given to the case because of the prominence of the parties and the amount involved. For a number of years the Keene Lumber Company, conducted by the late John F. O'Brien and Thomas B. Cotter, carried on extensive pulpwood dealings with the Rogers concern and the action was instituted in order to recover a balance amounting to $48,753.90 which the plaintiff alleged was owed. This action resulted in a counterclaim against the lumber company in which damages of $68,554.47 were asked and the trial was held before Judge Heffernan at Plattsburg in June of last year. Following a lengthy trial the jury returned a verdict in favor of the defendant and against the plaintiff to the extent of $19,800.57.

The plaintiff requested that this verdict be set aside and arguments were heard on the motion in county court at Hudson Falls during last month. Under the present order of the court the verdict is set aside and a new trial granted on the grounds that the verdict is contrary to law, contrary to and against the weight of evidence and particularly in the interest of justice and fairness a new trial should be had. The plaintiff was represented in the litigation by Judge James McPhillips and C. E. Fitzgerald, of Glens Falls, while the defendant was represented by Pierce and Holcomb, of Plattsburg, and Joseph Rosch, of Albany.

To Curtail Pulp Production

WASHINGTON, D. C. June 10, 1931—The recent conference of sulphite pulp producers has given rise to persistent rumours of a further curtailment in production according to a report from Oslo to the Department of Commerce. Evidently the 15 per cent originally agreed upon is not sufficient in spite of the fact that the Norwegian production has been taken of the market. Another meeting of mill representatives is to be held in August, but it is possible that definite steps may be taken before that time through the central office of the organization.

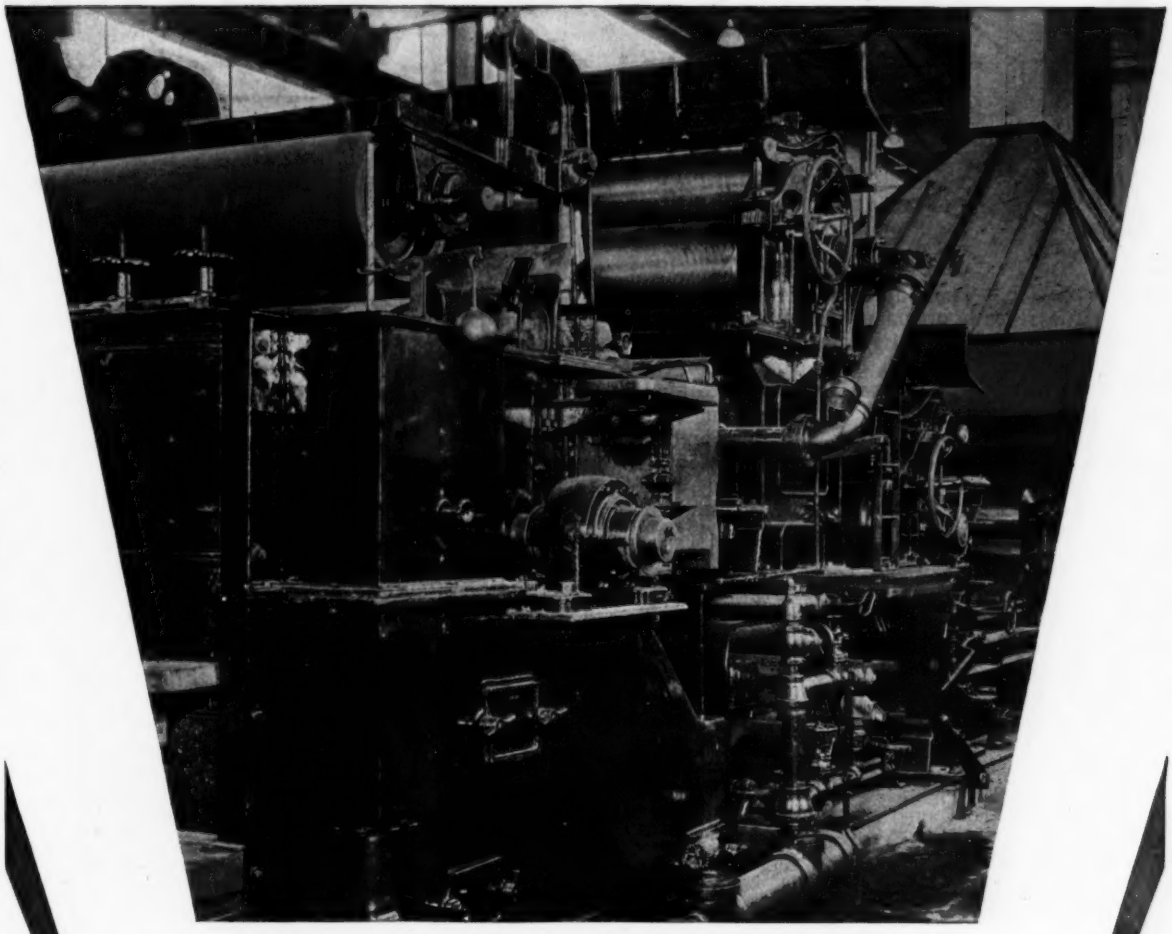
Suspended Freight Schedule Cancelled

WASHINGTON, D. C., June 24, 1931—In connection with a recent investigation the Interstate Commerce Commission has found that proposed reduced rates on paper and paper articles, in carloads, between Milwaukee, Wis., Chicago and Peoria, Ill., and points grouped therewith on the one hand and points in Iowa on the other hand, and between St. Louis and Points grouped therewith and Newton, Iowa, are not justified. The suspended schedules have been ordered cancelled and the proceeding discontinued.

Bids for Government Paper

WASHINGTON, D. C., June 24, 1931—The Government Printing Office has received the following bids for 80,000 pounds of No. 2 quality binders board; Consolidated Paper Company at 3.25 cents per pound; Mathers-Lamm Paper Company, 3.171 cents; Dobler & Mudge, 3.25 cents; R. P. Andrews Paper Company, 3.15 cents; Barton, Duer & Koch Paper Company, 3.3 cents; Old Dominion Paper Company, 3.15 cents; and C. L. LaBoiteaux Company, 3.2 cents.

DOWNINGTOWN



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Every Felt Machine built by this company for the past 15 years has been equipped with suction rolls, some of these being suction press. A few of the prominent manufacturers having Downingtown Felt Machines are Congoleum-Nairn, Inc., Philip Carey Mfg. Co., Flintkote Company, Barrett Co., and F. J. Watson Co. If you would like some information regarding the benefits obtained from the installation of Downingtown Suction Rolls on felt machines or on machines making practically every kind of paper or board, write us. Our Catalog No. 103 fully describes the roll. The Downingtown Manufacturing Company, Downingtown, Pennsylvania.

CONSTRUCTION NEWS

A Summary of Vital Facts Regarding Construction, Finances and Operation of Paper Mills

Construction News

Seattle, Wash.—The Superior Felt and Paper Company, Seattle, recently organized by Ray E. Stanley, Seattle, and associates, has arranged for purchase of tract of land at Twenty-eighth avenue, N.W., and Salmon Bay, approximating over 320,000 square feet, as a site for a new mill for the production of roofing papers, roofing felt, wallboard and allied products. Plans will be prepared for initial plant at an early date, with erection scheduled to begin in July. It will be equipped for a capacity of about 20 tons of paper daily, about 10 tons of roofing felt, and approximately 30 tons of wallboard and kindred products. The plant is reported to cost close to $225,000, with machinery. Company is capitalized at $400,000. Mr. Stanley will be president, and will be in active charge of mill project.

Fredericksburg, Va.—The Sylvania Industrial Corporation, 122 East 42nd street, New York, has awarded a general contract to the Hughes-Foulkrod Company, 1505 Race street, Philadelphia, Pa., for the construction of proposed new addition to plant at Fredericksburg, used for the production of transparent papers. Work will consist of three main multi-story units to cost about $1,000,000, with machinery. Equipment will be provided for the employment of about 150 additional operatives. Erection will be placed under way at an early date. The Ballinger Company, Twelfth and Chestnut streets, Philadelphia, Pa., is architect and engineer. H. H. Replogle is vice-president in charge of operations.

Oswego, N. Y.—The Snow-White Company, Inc., has taken over the former local plant of the Oswego Yarn Mills, and will remodel and equip for a new mill for the production of paper pulp, using waste paper stocks under a special process. It is proposed to have the plant ready for operation at an early date. William J. Dial, formerly of Dayton, Ohio, will be superintendent at the new mill.

Port Huron, Mich.—The Port Huron Sulphite and Paper Company, Port Huron, is now giving employment to a working force of about 140 men, or more than at the first of the year. Company is gradually advancing output and is said to be planning to continue on present basis, with same working quota, for an indefinite period

Norfolk, Va.—The National Bag and Paper Company, Norfolk, is planning rebuilding of portion of plant recently damaged by fire. An official estimate of loss has not been announced.

Troy, N. Y.—The Behr-Manning Corporation, Troy, manufacturer of sandpaper, emery paper and kindred products, has arranged for a merger with the Norton Company, Worcester, Mass., manufacturer of other abrasive materials. Plants of the two organizations, including present company names and personnel, will be continued as heretofore. The consolidated organization will have a capitalization of $23,000,000, and proposes to carry out a general expansion and development program. The Troy plant is giving employment to about 400 operatives, while the Worcester plant has a working quota of close to 800 persons, and both units will be continued on such basis. F. E. Gallagher is vice-president of the Behr-Manning Corporation.

Hackensack, N. J.—Harry C. Harper, Hackensack, former sheriff, and associates have negotiations under way for the purchase of the former local mill of the Campbell Wall Paper Company, and will use for another line of industrial service, including a large freight terminal. A price of $300,000 is asked for the plant.

Port Huron, Mich.—The Dunn Sulphite and Paper Company, Port Huron, is working on an improved production schedule and is said to be giving employment to about 10 per cent larger working force than at the first of the year. It is expected to hold to the present operating basis for an indefinite period.

Tuscaloosa, Ala.—Thomas H. Maxwell, Woodbank Plantation, Route 1, Tuscaloosa, is at the head of a project to establish and operate a plant in this vicinity for the manufacture of paper products, using cornstalks as raw material. The project is in a preliminary stage. It is proposed to organize a company to carry out the development.

Ocean Falls, B. C.—The Pacific Mills, Ltd., Ocean Falls, operating a local newsprint mill, a subsidiary of the Crown-Zellerbach Corporation, San Francisco, Cal., is running on close to normal production schedule, giving employment to about 1700 men. On regular basis, the company produces about 75,000 tons of newsprint, as well as 10,000 tons of wrapping papers, and 3,000 tons of tissue papers per annum, and utilizes close to 80,000,000 board feet of timber for pulp conversion for this output. The Ocean Falls mill is said to represent an investment of about $25,000,000. The company is also operating a converting plant at Vancouver, B. C., and is maintaining a satisfactory schedule with close to normal working quota at that mill.

Merritton, Ont.—The former three-story mill of the Riordon Paper Mills at Merritton, idle since 1919, was partially destroyed by fire, June 5, with loss reported at close to $40,000. The fire started in the sulphite vat department at the old mill.

Buffalo, N. Y.—The DuPont Cellophane Company, River Road, manufacturer of transparent cellulose paper materials, has completed plans for proposed new addition to local mill, for large increase in present capacity. Foundations for new units are scheduled to be placed under way at once. Facilities will be provided for the employment of more than 300 additional operatives. Entire program is reported to cost close to $2,000,000, including machinery. Company engineering department is in charge.

Somerville, Mass.—The Consolidated Paper Box Company, Somerville, recently organized with a capital of $200,000, is planning operation of a local plant for the manufacture of paper boxes, cardboard containers and

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kindred products. A. C. Wiswall is president of the new company; A. M. Bond, 20 Cottage Park avenue, Cambridge, Mass., is treasurer and company representative.

Philadelphia, Pa.—The National Fiberstok Envelope Company, 427 Moyer street, manufacturer of fiber and heavy paper envelopes, etc., has acquired a three-story factory at 800 Sixty-fifth avenue, and is said to be planning to occupy in the future for increased production.

Springfield, Mass.—The Fitzpatrick Wall Paper Company has been incorporated with a capital of $5,000 to deal in wallpaper. Farrell J. Fitzpatrick is president, and David Goldberg, Springfield, treasurer and representative.

New Companies

Green Bay, Wis.—The Freeman Paper Company, 1800 South Broadway, has been organized with a capital of $75,000, to manufacture and deal in paper products of various kinds. The incorporators are Arthur Freeman, Joseph J. Bins and Charles W. Bidwell, West De Pere, Wis.

Hartford, Conn.—The City Paper Company has been incorporated with a capital of 54,000 shares of stock, no par value, to deal in paper goods of various kinds. The incorporators are Saul Tulin, J. L. Cohen and A. N. Tulin, 229 Vine street, Hartford. Last noted is company representative.

Philadelphia, Pa.—The Kornberg Paper Company, 139 North 11th street, has been organized to deal in paper products of various kinds. Harry A. Kornberg, 5418 Osage avenue, Philadelphia, heads the company.

Indianapolis Paper Demand Slow

[FROM OUR REGULAR CORRESPONDENT]

INDIANAPOLIS, Ind., June 22, 1931.—It is a bit difficult to find encouraging features in the local market when there are so few available, but one occurred during last week that might offer some. At a convention here of the Ohio Valley Shippers' Association, it was reported by the statistical department that business had increased, according to the association's shipments, since the first of the year. Paper men here, of course, are far from satisfied. Business is being done, but there is little life to it. They expect this summer to be about on a par with that of last year, but the general opinion is that the coming of fall will see a definite, even if small, tendency toward more activity.

Most of the container manufacturers in this territory are making time. Demand is off, except on some items concerned strictly with seasonal products and their plants are producing only for present business. Prices are somewhat shot and there is a tendency on the part of some who have surplus stocks to make concessions. In fact price disturbances are the rule in most paper grades.

The paper stock market here is virtually nil. Prices paid are the lowest for months and the paper stock jobbers are loath to buy even at the low prices. The warehouses are full and they are awaiting the time when the mills will re-enter the market.

There is some demand for specialties. It is barely possible this demand will show a very slight increase over the same period last year. The fact that early spring buying on the part of retailers was of such small volume, is causing them to return to the market for small purchases now that the first supplies are being depleted. Napkins, paper cups, towels, plates and all similar merchandise are being sold, all orders being for small lots, but the fact that they are rather frequent lends some encouragement. Glassines are just about the same. Some demand is seen for building paper, but the volume is small.

New TAPPI Members

Charles W. Boyce, secretary of the American Paper and Pulp Association, is a graduate of the University of Michigan and has attended Yale, American University and Columbia. Prior to becoming associated with the A.P.P.A. Mr. Boyce was in the U. S. Forest Service on the Pacific Coast and in Washington, D. C.

Eugene L. Keller has been junior chemist at the Forest Products Laboratory, Madison, Wis., since he graduated from Pennsylvania State College in 1930.

Harry F. Lewis, professor of organic chemistry and dean of students at the Institute of Paper Chemistry, Appleton, Wis., graduated from Wesleyan University and received his Ph. D. degree in 1916 from the University of Illinois. Dr. Lewis has been a professor of chemistry at the University of Maine, Cornell College, and Ohio Wesleyan University. He has also been engaged in research work at the National Aniline and Chemical Company plant at Buffalo, and the Color Investigation Laboratory of the Bureau of Chemistry, Washington.

Herman C. Macaulay is general superintendent of the Rumford, Maine, mill of the Continental Paper and Bag Corporation with which he has been associated since 1908. An article by Mr. Macualay on paper mill management appeared in the PAPER TRADE JOURNAL on March 26, 1931.

Peter Parent is a sulphite cook at the pulp mill of the Shaffer Box Company, Tacoma, Wash. Prior to going with this company he was for ten years associated with the Great Western Paper Company at Ladysmith, Wisconsin.

Lyman M. Smith was since 1926 and until recently, mill manager of the Camas Wash., mill of the Crown Willamette Paper Company. From 1920 to 1926 he was assistant general manager of the Brompton Pulp and Paper Company, East Angus, P. Q. and from 1912 to 1920 was engineer and assistant manager of the John Lang Paper Company in Philadelphia. He is a graduate in mechanical engineering from Worcester Polytechnic Institute in 1912 and is at present located in Brattleboro, Vermont.

Gunnar Sundstrom was a chemist for the past year at the Bogalusa Paper Company, Bogalusa, La. He is a graduate of Orebro Technical University in 1925, following which he was technical superintendent at Hellefors Bruks A/B, in Sweden. He is now temporarily located at 300 Jefferson Street, Natchez, Miss.

Paper Mill Waste for Tannic Acid

[FROM OUR REGULAR CORRESPONDENT]

PORTLAND, Ore., June 20, 1931.—Willis E. Straight, forestry engineer and timber estimator, acting for eastern interests, met with Commissioner Mann of the city council of Portland, June 10 to discuss sites for a proposed tannic acid plant which would use the waste products of paper mills by a process of conversion into tannic acid.

The first unit, according to report, would cost $150,000 and employ 200 men. A considerable expansion would go forward as soon as the waste materials shipping develops in the area served. Mr. Straight examined several sites that had the required transportation facilities.

Hemlock bark, now a source of expense to the paper mills, will be used in the manufacture of the tannic acid. since the removal of the bark fro mthe hemlock logs now costs the paper mills money without any marketable value, and this new factory will absorb this waste bark.

A site in the Columbia slough district has been considered a feasible one for the acid plant as it lies between the paper mills at St. Helens, Oregon, on the Lower Columbia river and the huge properties of the Crown-Willamette Paper Company at Camas, Wash.

POWER PLANT SECTION

REDUCING POWER COSTS THROUGH UNIT TREATMENT

Conducted by Reginald Trautschold Consulting Engineer

Filters and Filtration*

Savealls—Thickeners—Washers

The virtual elimination of white water losses, *i. e.*, a recovery of 90 per cent or more of the fine fibers, constitutes one of the most important advances consummated in the paper making industry during the past decade. Where mills running without efficient, modern, recovery units contract white water losses of from 6 to 10 pounds per 1,000 gallons, mills employing up-to-date systems of continuous filtration have cut this waste by five-sixth. That is, stock shrinkage has been reduced from as much as 6 per cent. to less than 1 per cent. In a 100-ton mill, for instance, a recovery of about 5 tons of fiber per day can be effected, valued at upward of $100.00, $30,000.00 or more a year.

In view of such savings, particularly as the investment entailed is usually returned in full in less than a year, it is not at all surprising that to the mill man the questions of filters and filtration have become almost synonymous with the handling of white water. While this is not exactly so, for there are other important filtration processes essential to the efficient and economical conduct of the power and mill, the salvage of the fine pulp fibers from the white water stands out so prominently that a brief exposition of the principles involved in the continuous vacuum filter and of its many applications in modern mill practice can well command first consideration.

Principles of Operation

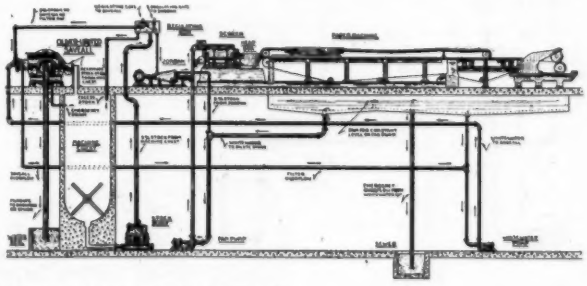
In both the drum and disc types of filters, the salvage of the finer fibers, the white water solids, is effected most efficiently by utilizing the high filtering proclivities of the pulp itself. Drums or discs covered with a wire facing and subjected to a suction induced by a vacuum pump or barometric leg are partially submerged in a tank of the white water from which the pulp stock is to be recovered, vacuums of from 5 to 20 inches being applied to the filtering surface. As the water is drawn through the wire facing by the suction, the pulp is screened out and forms an effective superimposed filtering blanket, or sheet, about the outside of the slowly revolving drum or disc, an ideal filtering medium.

The white water coming direct from the paper machine contains only the finer fibers, however, those which have passed through the paper machine wire, the freeness of which is exceedingly low. Even moderate recovery on such stock cannot be consummated expeditiously or economically, the use of extremely fine wire facings which clog readily being necessarily entailed, so in all approved modern systems of white water solids recovery, the white water has to be sweetened by the addition of a certain proportion of the longer fiber stock furnished to the paper machine. The presence of this machine furnish, or "borrowed stock," permits much coarser screening to be employed and at the same time assures the rapid formation of the sheet which actually consummates the filtering process. The sheet formation is very rapid when the stock consistency and screen mesh are suitably proportioned and practically all the water discharged is effectively filtered and screened, clarified. During the process, the sheet increases in thickness, of course, but it maintains its porous character and continues to act as an ideal filtering medium, passing large volumes of clear water readily while the fine fibers are entrapped and retained in the sheet.

Saveall Applications

Functioning as a saveall, a fairly thick sheet of this porous pulp stock is formed on these revolving screens, the white water being sweetened until it contains in the neighborhood of 33 pounds of pulp per 1,000 gallons. The furnish added increases the porosity of the white water solids so that a sheet ¼ to ⅜ inch in thickness forms easily on a 40 or 50 mesh wire traveling at suitable speed.

The borrowed stock, the furnish, is advisedly drawn from ahead of the Jordans, in order to secure the full advantages of the freeness of long fiber stock, and is, of course, returned to the stock chest with the recovered fine fibers, so there is practically no fiber loss. The filtrate from the screen, furthermore, is made of use in the paper machine showers or for any other purpose requiring a supply of clarified water. Hence, with virtually all the fine white water solids returned to the paper machine chest, thence to the paper machine and subsequently included in



Courtesy: Oliver United Filters, Inc.

FIG. 1.
Flow sheet of vacuum filter saveall operating on white water from paper machine.

* For previous discussion on filtration see Paper Trade Journal, Jan. 9, 1930.

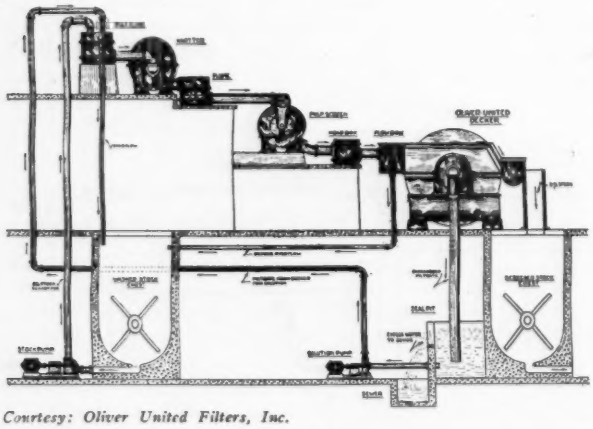
the paper product and weighed in the roll, white water shrinkage is to all intent and purpose eliminated.

Operating results with the recovered fines returned to the machine chest show that a better formed and better filled sheet is produced by the paper machine than can be manufactured if the fines are wasted in the final white water. The interlocking of the finer fibers with the longer ones, when these modern savealls are employed, improves both the strength and finish of the paper, such benefits being in addition to the substantial savings effected by the marked reduction in white water losses. Also, since each paper machine is operated in close circuit with its individual saveall, there is no danger of contamination due to variation in stock and color.

Decker Filtration

Sharp separation of pulp from water, with consequent high fiber recovery, is secured with quite similar vacuum filters by delivering the pulp direct from the screens to the decker, or vacuum filter unit, and using a barometric leg to induce the necessary suction, the thickened pulp stock being discharged into a chest below the decker. In such processes, the pulp supply is taken from the washed stock chest and diluted with filtrate from the decker, a customary arrangement being to mix the pulp stock and filtrate in an elevated pulp flume, from which the lower consistency stock flows successively through the knotter, flume, pulp screen, head box and flow box to the decker filtering unit. From the latter, the discharged filtrate passes to a seal pit and the screened stock is discharged to the chest provided for its accommodation.

With chemical pulps, sulphite, sulphate and soda, which have high freeness, large capacities are attained at quite moderate decker speeds, 1.2 to 2.0 revolutions per minute. A sheet from ¼ to 1 inch in thickness is readily formed, depending upon the freeness and consistency of the feed, which is customarily from 0.2 to 0.6 per cent. pulp. The filtrate averages, as a rule, less than 0.4 pounds of pulp fiber per 1,000 gallons and the pulp sheet can be discharged at any consistency desired up to about 10 per cent. without the use of press rolls. Furthermore, since the sheet is formed under vacuum, the pulp can be thoroughly washed as soon as the sheet leaves the pulp level in the decker vat and while it is still under vacuum, fresh water evenly applied by sprays replacing the cooking liquid retained in the pulp. This final washing is important, for it reduces alum consumption and later eliminates foaming on the paper machines.



Courtesy: Oliver United Filters, Inc.

FIG. 2.
Flow sheet of vacuum filter decker producing screened stock from 3 per cent washed stock.

With modern vacuum filter deckers for groundwood stock, maximum capacity is obtained at some sacrifice in clarity of filtrate and at a speed which forms a sheet only ⅛ inch or less in thickness, but in plants where all the white water from the deckers is returned to the system for diluting stock or for use in screen showers the fiber content of the filtrate per 1,000 gallons may not be as much as 2½ pounds. This low fiber content is much below that usually carried in the circulating water in a groundwood mill and is responsible for increased production per cord of wood and for causing less trouble from the accumulation of fiber in piping and showers.

Thickeners and Washers

The uses of vacuum filters as thickeners and washers are also of high importance, but these essential processes in the production of high grade pulps need not be elaborated upon in a general discussion of this character, though a few remarks of a very general nature may be of interest. This, because the best grade pulp is produced when the pulp is bleached at high consistency.

Modern plants have adopted the practice for the most part and many of the older mills are being converted to high density bleaching in order to compete with the newer mills. As in the case of modern vacuum filter savealls and deckers, the principles of continuous filtration are entailed, the chief advantage of which is the production of a sheet in uniform consistency throughout, with no spots of high consistency or soft portions of low consistency present.

The manner in which the sheet is formed on the revolving vacuum filter surface makes the pulp an excellent absorbent, as well as a filtering medium, with the result that it takes up the bleach liquor uniformly and rapidly when the pulp comes in contact with the bleach. There is no twisting or knotting of the fibers in the formation of the sheet, nor is there any action which tends to decrease the strength of the pulp.

The stock to be thickened should be held at about 1 to 1½ per cent. consistency and the feed maintained substantially uniform, in order to form a sheet of even thickness. The pulp stock is usually stored in a chest at 3 per cent. consistency and pumped to a flow box where it is diluted and then delivered to the vacuum filter thickener. The sheet is formed under vacuum until it attains a uniform thickness of an inch or more and is then carried over the cylinder passes and under press rolls mounted over the cylinder, the rolls squeezing the water out of the sheet while it is still under vaccum.

As discharged in high density formation, the sheet is at 20 to 26 per cent. consistency, as may be required, the consistency being regulated by the pressure applied to the rolls. After the squeegee operation, the sheet is discharged through a shredder which breaks it up into small pieces, easily handled on conveyors, so that the pulp will mix uniformly in the bleaching cells.

Densities up to 20 per cent. can be secured with two press rolls and barometric leg, but for higher densities three or four press rolls may be necessary and the barometric leg must be of sufficient length to induce a suction of 12 to 15 inches of vacuum. Where a barometric leg is not available, a small vacuum pump is required to maintain the required suction. Under such conditions, the waste water, or effluent, from the thickener will contain less than 3/10 pound of fiber per 1,000 gallons of discharge. This low content is equivalent to only 8 pounds of fiber per ton of pulp produced, a trivial loss of 0.4 per cent.

Where only medium density thickening is required, a sheet of 10 per cent. consistency is readily obtained with a vacuum filter thickener supplied with a feed of 0.5 per

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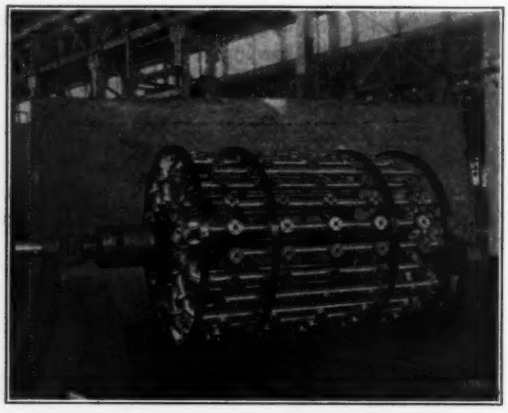
cent. fiber. The resulting pulp sheet can, as in the case of decker operation, be washed with fresh water to remove the last vestige of cooking liquor and if machine white water is used in place of fresh water for the dilution of the thickener feed the benefit of a saveall action is also secured.

In making high grade bleached pulp, it is essential, of course, to remove the soluble chlorides and colloidal impurities as soon as the bleaching is consummated. This is very important when pulp is bleached at high consistency, or density, with concentrated bleach solutions, as has become approved practice, for if the washing is delayed or poorly performed, the pulp will be off color and will lose strength. Efficient washing is also necessary to assure a white sheet which will not change color, for a poorly washed sheet is very apt to darken on drying. Good washing, furthermore, guards against foaming on the paper machine and reduces the amount of alum consumed.

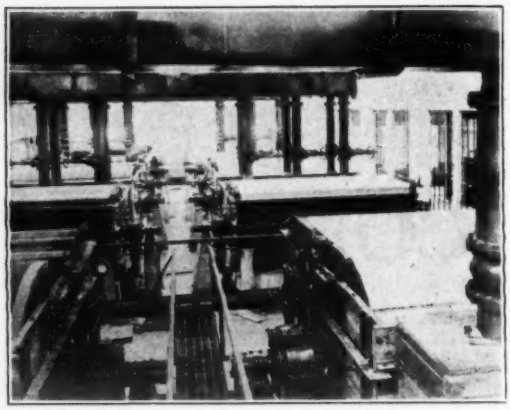
In the consummation of this highly important washing, the continuous vacuum filter finds an important field, for the removal of the bleaching solution is effected best, probably, by a system of dilution and replacement. The bleached pulp, after being sluiced from the bleaching unit to a chest, is delivered to a flow box on a vacuum filter and there diluted to a pulp consistency of about 1 per cent., by the addition of the necessary amount of machine white water or other suitable mill supply. From this low consistency stock, a pulp sheet is formed under vacuum, or suction, the operation being similar to that described for savealls, deckers and thickeners. As much as 90 per cent. of the diluted solution is removed as filtrate and with it 90 per cent. of the impurities. A replacement wash of fresh water, after the sheet leaves the stock level and passes over the cylinder where the water is drawn through the sheet by suction, displaces the soluble impurities remaining on the fibers, after which the washed sheet is discharged at 10 per cent. or any lower consistency required for subsequent handling.

Bleach stock containing as much as 7 per cent. of calcium chloride can have such amount of impurity reduced to less than 0.12 per cent. in one operation. The waste water containing the bleach solution and colloidal materials has to be thrown away, of course, but if paper machine white water is used for the dilution of the stock, the recovery of fiber and filler will run as high as 100 pounds per ton of pulp washed, or to 5 tons per day in a 100-ton mill, the vacuum filter operating both as a bleach washer and a saveall.



Courtesy: Filtration Engineers, Inc.

FIG. 3.
Skeleton construction of chain line for vacuum filter washer installed at the St. Helens Pulp & Paper Co.



Courtesy: Filtration Engineers, Inc.

FIG. 4.
Installation at the Maine Seaboard Paper Co., Bucksport, Me.

In the manufacture of soda or sulphate pulp, likewise, it is essential to wash the pulp thoroughly before delivering it to the screens and in performing this washing operation it is necessary to secure maximum recovery of black liquor at high concentration and to eliminate all weak liquor losses. In such processes, also, continuous vacuum filtration likewise plays a prominent part in many mills.

The pulp is blown from the digester into a vertical, cylindrical blow tank with a conical bottom and fitted with a vertical shaft agitator, where high pressure black liquor is forced into the tank at the agitator level in an amount sufficient to reduce the pulp in the agitated zone to 3 per cent. consistency. This 3 per cent. pulp is then drawn from the bottom of the blow tank by a plunger pump and delivered to the head box located above a continuous vacuum filter washer, from which receptacle it is withdrawn at a uniform rate to the flow box where additional black liquor is furnished to reduce the consistency of the stock to about 1 per cent.

This dilute pulp is fed to a vacuum filter washer, on the wire facing of which a suction of about 10-inch vacuum is maintained, and a homogeneous pulp sheet of about 1½ inches in thickness is formed. The sheet is of an open texture and in admirable condition for the removal of the black liquor by washing. A shower of hot water is applied uniformly over the sheet and is drawn through the pulp by suction, displacing the black liquor with a relatively small amount of wash water, returning a high strength of black liquor to the evaporators and reducing the soda content of the sheet to a minimum. The suction is maintained by a vacuum pump and the black liquor is drawn through the filter washer to a receiver from whence it is pumped to the black liquor storage tanks.

Continuous filtration is also used extensively in the causticizing room of pulp and paper mills to recover the caustic liquor from the lime mud. This application need not be enlarged upon, however, for it is not as novel as some of those which have been described and is, consequently, familiar to more of the mills of the paper making industry. It might be mentioned, however, that the lime mud can be so effectively filtered and washed that when it is discharged from the vacuum filter its alkali content is less than 0.5 per cent. Na_2O. Another matter of interest is that all the filtrate from the vacuum filter is used as make-up liquor in the causterizing systems and this way all of the soda washed out of the lime mud eventually joins

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the strong white liquor and is used in the digesters.

Continuous Filtration Design

"In continuous filtration design, a problem in hydraulics is brought up more than once having to do with the niceties of filtration, for it becomes essential to design the under-drainage, drain lines and barometric leg to handle the flow for the specific job. This can be appreciated more readily, perhaps, when it is realized that a certain size unit, when handling the thickening of groundwood, for example, will have a flow of 1,500 gallons per minute, while the same unit (in filter area), when handling the thickening of sulphite, will have a flow of better than 5,000 gallons per minute. The problem is to design efficiently in order to take care of these widely differing rates of flow and this is made more difficult by reason of the facts that if the pipes are made too large, barometric leg operation will not be possible, and if the pipes are made too small they become the neck of the bottle, so to speak, and maximum capacity cannot be realized.

"The skeleton construction of the drain line within the cylinder, or filter drum, is shown in the view of the equipment recently supplied the St. Helens Pulp and Paper Company, St. Helens, Ore. This unit is of the high flow type, as evidenced by the size of the large drain lines required to handle the heavy gallonage passed. The multiplicity of outlets across the compartments also indicates the fine vacuum distribution which assures the uniform deposit and dewatering of pulp on the cylinder.

"In the view of the installation at the Maine Seaboard Paper Company at Bucksport, Me., a highly efficient and unique method used to remove the pulp from the cylinders is shown, consisting of running a series of strings around the cylinder and over a small discharge spaced about ½ inch apart, comparable in a way to a multi-rope drive at endless members. The advantages of this type discharge are obvious, for it enables a perfect discharge of pulp to be effected, whether the sheet is as thin as that of groundwood or as thick as that of Kraft. The arrangement gives a positive discharge and, because of the lifting of the pulp from the wire, it also cleans the wire. The arrangement also removes all mechanical wear from the covering wire and there are records of groundwood decker thickeners, employing this method of discharge, which have had a covering wire life of more than 2½ years. Because of the cleaning action of the discharge, also, machines have been run for better than a month without any need of steaming the covering wire.

"Another interesting feature of the design is the method of supporting the covering wire on the cylinder, or drum, of the unit, *i. e.*, the underdrainage. A spiral bronze wire made about ¼ inch deep is employed, such wire giving a maximum support to the covering wire and a minimum restriction to the flow of water through the filter. Because of this free flowing characteristic, it is virtually impossible to clog up the underdrainage with fines, even when running on the slowest groundwood.

"Evidence of this latter feature has been ample, for even after a year of operation no indications of flour or slime was found on the spiral underdrainage, when the covering wire was removed. The distribution of drain outlets from the compartments of the drain line within the cylinder of the unit is also a feature of this particular equipment, a two valve construction on the machine enabling very high flows to be handled. On this score, records show that a single machine has handled better than 4,500 gallons of water per minute.

"Two recent installations of these distinctive vacuum filters were made in two of the newest mills for the manufacture of news print. One of these was at the Mersey Paper Company, consisting of eight groundwood deckers and two sulphite savealls, and the other at the Maine Seaboard Company where the installed complement was similar. Both installations entailed investments of well over $110,000.00, about one-fifth of which was for the savealls.

"The salvage effected by the sulphite decker-savealls, which are capable of handling in excess of 3,000 gallons of white water per minute, represent, at 95 per cent. efficiency, an average of some 9½ pounds of fiber reclaimed from each 1,000 gallons of white water, or 20.5 tons of fiber per day. This groundwood stock is worth about $20.00 a ton, so the net saving in stock effected by the savealls is upward of $400.00 a day, or in the neighborhood of $120,000.00 a year.

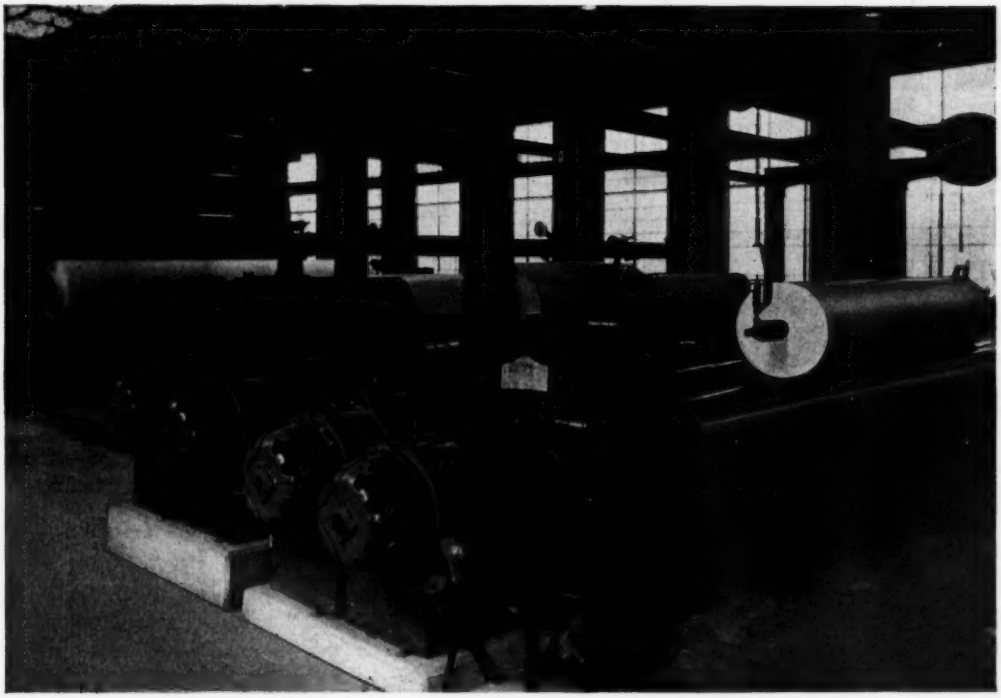
"The savings effected by the groundwood deckers are to a considerable extent intangible, it is true, but they include trapping the flour in the groundwood, holding the flour in the system and by so doing assuring a better sheet formation. The use of these modern groundwood deckers also permits the venting of the system when, in warm weather, bacterial action would otherwise take place in the mill with undue sliming and consequent production of an inferior paper. Furthermore, as the groundwood deckers trap the flour and give a clear effluent, there is no circulation of the fines back through the system calling for increased screening capacity. These two latter gains, the ability to vent the system without appreciable fiber loss and the clear effluent discharge are in comparison with the results secured with old style deckers, the effluent from which had to be kept in the system to avoid heavy white water losses.

"This can readily be appreciated when it is realized that the effluent from a modern, groundwood, vacuum filter decker contains less than 0.8 pounds of pulp per 1,000 gallons, whereas the old time hydraulic decker has an effluent running from 4 to 6 pounds of fiber per 1,000 gallons. Another distinctive advantage of the groundwood filter decker is that it discharges the groundwood sheet at a consistency which may be considerably higher than that required. When this is the case, white water can be used for dilution to bring the consistency of the stock down to the desired point. This provides accurate control over the consistency of the groundwood, quite impossible when depending upon the old time decker which discharged the stock at very low consistency and did not permit any addition of white water for the proper regulation of stock consistency."

General Filtration and Water Conditioning

The successful operation of these various filtering devices and the capitalization in full upon efficient vacuum filtering practices is dependent, however, upon a satisfactory water supply, or supplies, for if quality paper is to be produced, white or colored, it is essential that clear water be employed, particularly for washing the pulp. Suspended solids in the water and impurities of all kinds must be removed prior to undertaking the production of paper. In fact, the use of proper water in paper making and in power plant operation is so important that the entailed phases of filtration and water conditioning will be discussed in these columns at an early date.

In presenting a discussion on continuous vacuum filtration in connection with mill operations proper first, the aim has been, not only to take up a question of vital concern to all mills, but by emphasizing the extent of the part played by filtration in paper making to arouse the interest of the mills in the equally important question of suitable water supplies.



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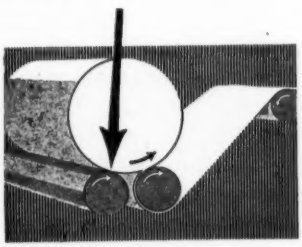

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And this slight decrease accomplished *automatically,* by the nature of the drive itself, instead of by frequent skilled manipulation—

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The saving in labor, and the gain in quality of product, will be appreciated by every mill superintendent.

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PAPER TRADE JOURNAL

ESTABLISHED 1872

Published at 34 North Crystal St., East Stroudsburg, Pa. Executive and Editorial Offices, 10 East 39th St., New York, N. Y

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Editor

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Price. Per Copy, 10 Cents. United States, Per Annum, $4.00
Canada and Foreign Countries in Postal Union, $6.00

Member Audit Bureau of Circulations

Vol. XCII New York, June 25, 1931 No. 26

MERGER PLANS IN CANADA

There are increasing indications that the plan proposed by the Security Holders Committee for the reorganization of the Canada Power and Paper Corporation will go through, not because it lacks criticism—there is plenty of that—but because there is no indication that any better plan, or one even so good, will be forthcoming. Opinion grows that the committee has accomplished a most difficult and arduous task in a highly courageous and sensible way. If a sufficient body of the security holders of the various constituent companies signify their adhesion to the plan the committee, according to its chairman, the Hon. C. A. Dunning, will announce its further plans in the matter of administration, executive direction, and technical management. A good impression regarding the independence of the committee has been created by the news that it was sponsored by Kitcat and Aitken and Lovett, Sons, & Co., of London, Eng., and by Iselin & Co., of New York, as well as by the Canadian banks, and other large holders of and sponsors of the securities.

Some discussion has arisen over the question as to whether or not the bond holders of the various companies might not take over their respective properties and separate them independently. But there are many difficulties in the way of securing working capital, pulpwood supplies and contracts.

All of these are taken care of in the Protective Committee's plan, and it is claimed there is every reason why under this plan Canada power during the next five years might develop into a really powerful news print operatives, because meanwhile fixed charges would be virtually eliminated and at the end of five years the benefits of the Hearst affiliation would be secured.

REDUCING POWER COSTS

Meat packing plants have the reputation for using "everything but the squeal," which means that every part of the animal is put to some economic use. Such complete utilization of by-products is not effected in all industrial activity.

Coal, for example, is widely converted into two forms of energy—heat and electricity. But each is usually produced separately.

Exhaust steam after it leaves the electric turbine to be condensed usually goes to heat the water of a nearby lake or river.

There is a similar waste of energy in industrial plants where steam is used for heat and its potential ability to turn a wheel and generate electric energy on the way is only partially exploited or ignored entirely.

Manufacturers and utility men are aware of this waste and for a long time have been considering ways to eliminate it. A writer on the *Chicago Tribune* relates some interesting experiments that have been undertaken.

Down at Baton Rouge, La., the Standard Oil Company of New York has a refinery and the Engineers Public Service company a generating station. The refinery uses a great deal of heat and some electric power and the power plant consumes much fuel.

A year ago a hookup was completed. The generating station now pipes its exhaust steam to the refinery for heat and receives in turn refinery waste for fuel. It now produces 150 per cent more power than the refinery can use and the surplus is put on the transmission lines and distributed from Baton Rouge to Lake Charles.

Electric energy is the by-product of this combination. An arrangement of this sort works well where operations are steady, but it would be less advantageous with other types of plants, such as rubber factories, where operations fluctuate. A widely variable supply of electric energy can only be used as dump power. For base power a steady uniform supply is required.

V. D. Simons, well known industrial and paper mill engineer, recently completed a survey of 23 large industrial plants to determine the feasibility of building joint power plants where electric energy would be the primary production and heat for the factory the by-product, thereby insuring a steady source of power for base load purposes.

He concludes that for a little additional cost in equipment many industrials can profitably produce not only heat and electricity for their own uses but surplus power for sale at a cost lower than the average utility generating station produces it.

The Munising Paper company at Munising, Mich., last fall put into operation a new plant embodying this principle. It now uses less coal than before and by creating higher pressure is able to produce not only enough electric energy for its own use but sells from 1,500 to 2,000 kilowatts to Cliffs Power and Light company.

Mr. Simons recommends that such joint plants be

owned and operated by the utility companies under an arrangement with the manufacturer whereby the latter is assured heat and power cheaper than he could produce them for his own use.

Adoption of such a plan, according to Mr. Simons, would enable the utilities to get additional industrial business that at present they are unable to compete for, it would enable the industrials to get their steam and power at the lowest possible costs, and would, in addition, make available to the utilities from five to eight billion kilowatt hours of energy at very favorable unit costs.

Savings are of vital importance just now to paper manufacturing companies and this certainly offers an interesting suggestion of how some of them at least can reduce their costs for steam and power service.

TAPPI Notes

Eugene N. Bechard has been officially appointed representative of the Eastwood Corporation in the Technical Association.

A. W. Nickerson of Process Engineers, Inc., has joined the research organization of Robert Gair Company, 420 Lexington Avenue, New York.

R. L. Davis of the Institute of Paper Chemistry is working during the summer at the Northwest Paper Company, Cloquet, Minn.

P. Fredrick Gross of the Institute of Paper Chemistry is working this summer for the Staley Sales Corporation at Decatur, Ill.

Karl Freudenberg, professor of cellulose chemistry at Heidelberg in Germany was a visitor to the TAPPI office this week. During the past half year, Doctor Freudenberg has been an exchange professor at the University of Wisconsin. On Monday he sailed on the Columbus for Bremen.

A. H. French, former chief chemist of the Johns Manville paper mill in Manville, N. J. will join the organization of the Staley Sales Corporation in Decatur, Illinois, beginning July 1.

Among the interesting documents deposited in the cornerstone recently laid in the new building of the Institute of Paper Chemistry, Appleton, Wisconsin was a roster of the members of the Technical Association of the Pulp and Paper Industry.

Power Development to Cost $591,000

[FROM OUR REGULAR CORRESPONDENT]

WATERTOWN, N. Y., June 22, 1931—The contract for the development of the Beebee Island hydro-electric development is under the supervision of Fred T. Ley & Co., of Springfield, Mass., and terms call for its completion by December. The estimated cost of the project is expected to exceed $591,000. A power plant is to be located on the north side of the island and a large force will eventually be employed. Under the terms of the contract the Ley concern takes over all construction hazards and the Beebee Island Corporation is liable for no further responsibilities other than that of meeting payment of the cost of the project. Under agreement the Niagara-Hudson Power Company will take all surplus current generated over and above the requirements of those concerns identified with the Beebee Island Corporation. The decision to go ahead with the project marks the end of a struggle of many years made by Knowlton Brothers to have the development carried out.

Canada's Pulpwood Industry

STURGEON FALLS, Ont., June 22, 1931.

Editor, PAPER TRADE JOURNAL:

Pulpwood, once the bread and butter of many settlers in the North, is now practically discarded. What is the matter with the pulpwood industry?

Our wood, at one time, found a ready market in the United States, but, to the dismay of many, the jobbers have been notified that they will not receive any contracts the coming season.

There is now unfair competition of Russian wood. Let us consider the aspect for a moment. Canadian pulpwood is superior to the pulpwood shipped from Russia, although many false statements to the contrary are circulated. However, we admit that Russian wood is better prepared than most Canadian wood. The jobbers of pulpwood shipped to the United States mills have been educating the farmers, settlers and woodsmen that their wood must be better prepared to compete with the Russian threat, with the result that this year the preparation of pulpwod is superior to that of any other time in the history of this industry. But the preparation of pulpwood is not primarily the cause of the depression of today.

For more than thirty years Canada has supplied the United States mills with wood, and if our wood was not of the highest quality, we could not have held this market. We can now remember that for the past many years there has been a cry through the public press, in the streets, on the platforms, and in some corners of our Parliament that the United States is cleaning our country of the choicest wood, robbing the forests, imperilling our greatest basic industry. These sources have been shouting that the only method to save the situation is by placing an embargo on the export of our wood. These exponents or champions of "Save the Wood," when asked where shall we find a market for our wood, replied that our industry could, and would absorb our cut, and thus save the situation.

How many mills in Canada today are purchasing wood from the farmers and settlers? The result of this cry is obvious; United States mills having been always confronted and threatened with this situation did what was only natural in finding another market in Russia. That country gladly disposed of her wood, thankful to find a ready market in the United States. This is the great reason that we are having competition from Russia today.

To further increase the trouble we find that the Canadian Railways discriminated against Canadian shippers of pulpwood. Russia could ship wood from Sorel, P. Q., to Watertown, in the State of New York, in which district great mills are situated, at a cheaper rate than Canadian wood. Why the railways allowed this unfair competition, especially in these trying times, demands an immediate explanation.

The return of this great Canadian industry could be accomplished, provided the freight rates remain equal for both Russian and Canadian wood, and further, if some security were given to the United States mills that there would be no embargo placed against them.

Very truly yours,
J. W. LALONDE.

Swedish News Print Production

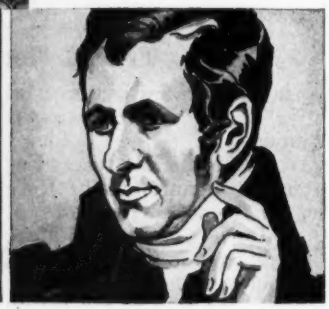
[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., June 24, 1931—Swedish news print mills during April turned out 17,673 metric tons of paper as against 17,968 tons in the preceding month and 16,451 tons during April of last year.

No. 4 of a series of advertisements tracing the development and uses of modern chemicals

HIGH SPOTS IN CHEMICAL HISTORY

Sir Humphry Davy's lecture hall at the Royal Institution, London, where an admission fee of twenty pounds was paid to see sodium produced by the electrolytic process. (Reproduced from "Famous Chemists" by Tilden with permission of the publishers, E. P. Dutton & Co., Inc.)



Sir Humphry Davy (1778-1829) whose research in alkalis enabled him to produce sodium by electrolysis.

CAUSTIC SODA

IN 1807 fashionable London paid twenty pounds a head to observe Sir Humphry Davy at the Royal Institution perform the miracle of the age... to see him produce sodium with a new-fangled electrical process. Davy's epoch-making discovery and his experiments in electrochemistry marked the beginning of the modern electrolytic process for manufacturing caustic soda... the second most important product in the alkali industry. 1930 caustic soda consumption amounted to 640,000 tons... an increase of 100% in eleven years.

Heading the list of important American industries using caustic soda in manufacturing processes is the rayon industry. In 1930, 110,000 tons of caustic were consumed in making artificial silk. Petroleum refiners ran the rayon makers a close second by consuming 105,000 tons. Next in importance as consumers of caustic soda are the soap makers... 100,000 tons were used to help keep the nation clean. Chemical manufacturers used another 100,000 tons.

Also, included among the important caustic users are the paper mills who buy 42,000 tons a year. The textile industry needs about 30,000 tons annually for cotton processing and mercerizing. Farther down the list are leather tanning, rubber reclaiming, vegetable oil refining, lye making and the preparation of pharmaceuticals and medicines, all of which consume considerable quantities.

The shipment of liquid caustic in tank cars is a recent development which reduces handling costs and at the same time renders the product more convenient to quantity users.

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Section of the
Technical Association of the Pulp and Paper Industry
Edited by Ronald G. Macdonald, Secretary

Current Paper Making Literature

Abstracts of Articles and Notes of Papermaking Inventions Compiled by the Committee on Abstracts and Bibliography of the Technical Association of the Pulp and Paper Industry

Clarence J. West, Chairman

Paper and Pulp Testing

The Determination of Pentosane in Pulp by Means of the Hydroxylamine Method. August Noll and Walter Belz. Papier-Fabr. 29, No. 3: 33 (Jan. 18, 1931).—The routine analytical hydroxylamine method for the determination of furfural is compared with the common phoroglucinal precipitation method. It was found that the first method gave higher results than the latter and that it only required a tenth of the time. A description of the method is given in detail along with the results. J. F. O.

A Quick Method for the Determination of Furfural. August Noll, Fritz Bolz and Walter Bolz. Papier-Fabr. 28, No. 36: 565-568, (Sept. 7, 1930).—By double decomposition with salts of hydroxylamine and titration of the liberated acid which occurs from the quantitative process of aldoxim formation, a new simple method of determining furfural is found. In this way, the furfural content of digester condensate and residual liquors can be determined. Simultaneous with this exact method for the determination of furfural is the possibility of an accurate pentosan determination in plant materials and pulps, in that the furfural formed in the acid distillation of pentosane containing substances can be recalculated from the furfural formed. This method saves much time and is more accurate than the precipitation method with phloroglucinal. The article is accompanied with equations and tables proving the method.—J. F. O.

Determination of the Dry Weight of Pulp Shipments. Bo. Wiesler. Papier-Fabr. 28, No. 39: 616-618 (Sept. 28, 1930).—The author discusses the importance of a correct moisture determination and also the causes for an uneven moisture content of rolls of pulp. The wedge method of taking moisture samples is proven superior to a method in which, for example, a boring device is used.—J. F. O.

The Determination of Water in Paper. E. H. Riesenfeld, and Toni Hamburger, Papier-Fabr. 28, No. 17: 288 (April 27, 1930).—Recognizing that the usual method of drying in an oven at 105 degrees C. does not remove the chemically absorbed water but only the physically bound, the author suggests the use of tetrachlor ethane which method will give the total water content. Results are given to compare the two methods and shows that there is on an average, about 1% more water in the paper than is tested for by drying at 105 degrees C.—J. F. O.

Moisture Determination in Pulp and Paper. K. G. Jonas. Papier-Fabr. 28, No. 25A: 111-112 (June 1930).—Although recognizing that the determination of moisture content in pulp and paper by drying requires considerable time, the author advises against the use of solvents to drive off the water, as in many cases, the solvents affect the pulp or leave salts behind in the pulp. If a dry current of air is used, the moisture test can be carried out in less time. Dry nitrogen gas can be used. The author then recommends a method whereby overheating and oxidation are avoided and reproducible results are obtained. The method is essentially allowing dry air at 65 degrees C. to pass through the pulp and paper.—J. F. O.

New Method for the Quantitative Determination of Ground Wood. August Noll and Fritz Holder. Papier-Fabr. 28, No. 44: 700-701 (Nov. 2, 1930).—References are first given of the methods used to date for the quantitative determination of ground wood in mixtures of the stock, and the shortcomings of each is discussed. The author then proposes a new and more accurate method by using potassium permanganate which reacts with the lignin. The percentage of ash is the only objectionable feature in this method as shown by actual tests on various printing papers whose ground wood content is also determined by microscopical test.—J. F. O.

Quality Determination of the Wood for Ground Wood and Chemical Pulp. Gustav G. Klem, Papier-Fabr. 28, No. 31: 489-494: No. 32: 501-508: No. 33: 521-524 (Aug. 17, 1930).—The width of the annual rings is no criterion for the volume weight of wood, as spruce wood from one region with an annual ring of 1 millimeter wide was not greater than the volume weight of a spruce wood from another region with an annual ring width of 3 millimeters. The volume weight increases with the increase in percentage of summer or late wood.

The three quality factors are; (1) The inner anatomical constitution of the wood, the physical properties of the fibers, and the relation of lignin to cellulose. (2) The content of bone dry wood per unit volume. (3) The quantity of knots in the wood.

Sixteen hundred and eighty different pieces of wood were used in the experiments and the results from each of the three regions of the country were recorded. The wood was in part classified according to the taper of the tree trunk. A slow tapering trunk gave less knots than a sharp tapered tree. With increasing pointness of tree trunk, the volume weight decreased. In other words the authors have shown that the form of the tree trunk has a decided influence over the quality of the wood and the pulp produced therefrom.—J. F. O.

Report of the Committee on Chemical and Physical Standards. M. O. Keay, Pulp Paper Mag. Can. 31, 185-188 (Feb. 5, 1931).—The present methods of preparing sheets for testing the initial strength of paper pulp prevailing in North America and in

TAPPI Section, Page 344

Europe are reviewed, discussing in turn the disintegration of the pulp, the formation of the sheet, couching, pressing, drying and conditioning. The committee considers that the best means yet devised for the formation of the test sheet is the British sheet machine; that the couching of the sheet should be done by means which eliminate the influence of the operator, which is probably best obtained by the use of a couch plate together with a roll of fixed weight as adopted by the British committee on evaluation of paper pulp; that the work of Cameron and his co-workers has shown that 200 lbs. per sq. in. is most satisfactory for pressing the sheets; and that the procedure of the British association for drying the sheets, though more elaborate, is justified because it eliminates the uncertainty which results from shrinkage when the sheet is not dried under tension. It is felt that as yet insufficient data have been accumulated to warrant definite recommendations.—A.P.-C.

Slowness Tester. Arthur B. Green. U. S. pat. 1,774,830, Sept. 2, 1930.—The principle of the invention rests on moving a screen or sieve through the sample of stock under the influence of a predetermined force, e.g., gravity, and measuring the resistance offered by the pulp to the travel of the screen. As a preferred means of effecting such measurement, a separate body of water or other liquid is displaced and allowed to escape at a predetermined rate, and the volume of the displaced liquid gives a measure of the slowness of the pulp.—A.P.-C.

Freeness Testing. W. Boyd Campbell. Research Notes 3, 25-30 (1930); Pulp Paper Mag. Can. 31, 264-267, 280 (Feb. 12, 1931).—The principles underlying freeness testing of pulps are discussed and the conditions necessary for the operation of freeness testers are pointed out. The effect of the pressure head and the duration of flow in compacting the pulp are particularly stressed. A mathematical analysis is given which relates the freeness as determined by the Canadian freeness tester and the English sheet machine to the specific resistance of the pulp to flow through it. For the Canadian tester $R=30.44\ (1000-V)/V$; for the English sheet machine $R=10.30tF/W$, where R is the resistance of 1 g. of pulp in a layer on a 100 sq. cm., surface V is the volume of outflow from the chamber at the end-point of the test, T is the time of flow in seconds, F is the fluidity of water in reciprocal centipoises, and W is the weight of sheet formed. It is pointed out that R is different when determined on the two machines and that the ratio of the two values is a measure of a pulp quality termed the compressibility. Experimental values of the ratio for groundwood are about 1.55, while for kraft and unbleached suphite (beaten) the value is about 3.0. It remains to be seen whether this quality varies in any one type of pulp to an extent sufficient to make the test of value for control work.—A. P.-C.

Bibliography of Wood Pulp Strength Testing. Donald E. Cable. Paper Trade J. 92, No. 9, 35-39 (Feb. 26, 1931).—This is a continuation of Moore's bibliography (Paper Trade J. 89, No. 12, 62-72; Sept. 19, 1929) and comprises abstracts of 27 articles published in 1929 and 1930.—A. P.-C.

Determination of the Strength of Pulps. K. G. Jonas. World's Paper Trade Rev. 95, 466, 468, 510-516 (Feb. 6, 1931).—In order that determinations of the strength of pulp may be of value, it is essential to have a beating method and a sheet forming method each giving reproducible results. The ideal experimental beater should fulfil the following conditions: (1) It must work reproducibly; (2) it should allow of a beating effect as nearly as possible corresponding to that of the beater in practice; (3) it should make it possible to work out a complete beating curve without a great consumption of time; (4) it should permit variation of and exact regulation of the beating pressure. These requirements are claimed to be met by a laboratory beater devised by the author and Kross. Six cylindrical beating containers are symmetrically arranged around the axis of a disk to which they are firmly but rotatably attached; they are closed by means of covers fitted with packing rings, each cover carrying a toothed wheel whih engages with a similar wheel keyed on a fixed central shaft, so that when the machine is running each container rotates about the central shaft and about its own axis. In each container is a beating roll consisting of a free massive cylinder, in whose surface a series of half-round (6-mm. diameter) flutes are milled so that a tooth 2mm. wide remains between adjacent flutes. The beating pressure is regulated by adjusting the speed of rotation. The equivalent of 11.2 g. of oven-dry pulp is weighed into each beating container, the calculated quantity of water (preferably to a consistency of 6%) is added, the material is softened by allowing to stand exactly 30 minutes and is then disintegrated by running for 10 minutes at 100 r.p.m.; beating is then carried out by running at a suitable speed (150 r.p.m. or more) so as to obtain a complete beating curve within one hour, the containers being successively removed at stated intervals and replaced by empty containers of the same weight. A test sheet forming machine is also described which is claimed to give very even formation and reproducible results, the variations in the strength of sheets made from the same pulp and beaten to the same degree being from 2 to 3 times as great using the Schopper sheet-former than with the Jonas-Kross apparatus. Jonas found that the highest breaking length was obtained with sheets weighing 90 to 92 g. per sq. m., and suggests that this weight should therefore be adopted.—A. P.-C.

Improved Constant Humidity Room. James d'A. Clarke. Paper Ind. 12, 1859-1863 (Feb. 1931).—A detailed description is given of a constant humidity room, based on, but somewhat modified from that described by Ruff, (Paper Trade J. 85, No. 8, 50-51 (Aug. 25, 1927), built and equipped at a cost of approximately $1000, and which has been operating with complete satisfaction since the end of 1928.—A. P.-C.

Testing of Paper for Water Resistance. Philip W. Codwise. Paper Trade J. 92, No. 10, 55-57 (March 5, 1931).—The dry-indicator method offers the greatest promise of development to a universally acceptable standard test for the degree of total size resistance. Preliminary collaborative work having given results that were inconclusive and that indicated the necessity of further development work, the following points were studied: Nature and preparation of the indicator mixture, application of the indicator on the test sheet, reading the endpoint, effects of humidity and temperature. A technique embodying the results of the investigation is described in detail.—A. P. C.

Porosity and Air Space of Paper. James Strachan. Paper Maker and Brit. Paper Trade J. 81, No. 1 xli-xliii (Jan. 1931).—A general discussion of the subject defining the difference between porosity and air-space, indicating the practical importance of the subject to paper users, outlining the methods of practical paper-making adopted in controlling porosity and air-space, and reviewing the methods of testing porosity of paper.—A. P.-C.

Instruments for Determining the Freeness or Degree of Beating of Paper Pulps. Louis Schopper Laboratories, Leipzig. Papier 33, 1303-1319 (Dec. 1930.)—A description of the construction and method of using the latest type of Schopper-Riegler freeness tester.—A. P.-C.

Folding Resistance of Paper. Raymond Fournier. Papeterie 53, 146-150 Feb. 10, 1931).—A brief description of a new type of folding-resistance tester, based on the same principle as the Schopper-Riegler but quite different in construction. The test strip is 15 by 180 mm. (as for the Schopper tensile test) and both ends are clamped in a 2-kilo weight, so that the tension is exactly 1 kilo. The fold is effected by passing the test sheet through a slot in a blade which is reciprocated vertically between 2 pairs of 14 mm. steel rolls mounted on ball bearings. When the strip breaks, the fall of the weight stops the motor and applies a powerful brake to the flywheel. An automatic revolution-counter indicates the number of double-folds.—A. P. C.

Cellulose & Lignin

Resins of Jack Pine. John B. Phillips. Pulp Paper Mag. Can. 61, 211-219 (Feb. 5, 1931).—The resins were found to consist of resin acids, fatty acids and unsaponifiable. The fatty constituents, to which are generally attributed so-called "pitch troubles" in pulp and paper mills, are made up largely of acids and glycerides of the unsaturated type (including large proportions of oleic and linolic acids and traces of linolenic acid). The fats of seasoned wood were found to contain a high percentage of oxidized fatty acids, probably derived from the unsaturated acids, which oxidize and polymerize very readily. These transformations involve a change from oily, sticky material to more inert, solid products. As it is generally agreed that pitch trouble is brought about mainly by flocculation and coagulation of resin particles, it is suggested that the possibilities of triethanolamine as an agent for removing the troublesome resinous particles, or rendering them harmless, should be investigated.—A. P.-C.

Studies on Lignin and Related Compounds. V. Action of Halogens on Lignin and Wood. Harold Hibbert and Charles A. Sankey. Can. J. Research 4, 110-118 (Feb. 1931).—The addition of bromine to lignin residues and compounds of related constitution was studied in some detail It was found that this addition is not only a function of time, concentration and a bromine solvent, but also of the acidity of the reaction medium. Evidence was obtained that renders it unlikely that di-isoeugenol and di-isosafrol are derivatives of syclobutane.

Adsorption of Water by Wood and by Cotton. Lloyd M. Pidgeon and O. Maass. J. Am. Chem. Soc. 52, 1053-1069 (March 1930) Research Notes 3, 39-45 (1930); Pulp Paper Mag. Can. 31, 296-299, 304-308 (Feb. 19, 1931).—The adsorption of water by certain coniferous woods and by cotton cellulose was measured, by a new method, covering the complete range of vapor pressures and producing adsorption isethermals for temperatures between 12° and 42°C. Heartwood and sap-wood appear to give identical adsorption values. In a wood which has been dried for a long period of time the adsorption isothermals are the same at low vapor pressures. This also applies to different species of wood. Cotton cellulose is fundamentally different from the cellulose in wood; this is brought out by the adsorption curves not coinciding over any portion of their length.—A. P.-C.

Extending Knowledge of Cellulose and Lignin. Harold Hibbert. Research Notes 3, 37-38 (1930); Pulp Paper Mag. Can. 31, 326-327 (Feb. 26, 1931).—A brief review of the work on these subjects carried out during 1930 at the Department of Industrial and Cellulose Chemistry, McGill University.—A. P.-C.

Chemistry of Lignin. V. The Distillation of Alkali Lignin with Zinc Dust in an Atmosphere of Hydrogen. Max Phillips. J. Am. Chem. Soc. 53, 768-774 (Feb. 1931).—Alkali lignin, isolated from corn cobs, was distilled with zinc dust in an atmosphere of hydrogen. The distillate consisted of an aqueous portion and an oil. The aqueous distillate contained (on the weight of lignin used) 1.48% methanol, 0.36% acetone and 0.24 per cent acetic acid; catechol was shown to be present The yield of oil amounted to 16 per cent of the weight of the lignin; 55 per cent of the oil was alkali-soluble, and guaiacol was identified in this fraction. The isolation of catechol and guaiacol as degradation products of lignin is believed to lend support to the hypothesis that lignin contains an aromatic nucleus. The evolution of carbon dioxide in this distillation indicates that, in all probability, the lignin molecule contains at least one carbon atom directly united to two oxygen atoms, which might indicate the presence of either a carboxyl group. free or esterified, or lactone group in the lignin molecule.—A. P.-C.

Alpha and Beta Ligno Sulphonic Acids. Erik Hagglund. Svensk Kem. Tid. 42; 159-66 (1930). (German). Alpha lignin is designated as that precipitated by naphthylamine; beta lignin is not precipitated. Data are presented showing that beta-lignin does not exist as such in the wood but is a degradation product formed by the action of hot sulphite liquor. The relative amounts of alpha and beta lignins are determined by the drasticity of the cooking conditions.—C. E. P.

Tentative Standard Method for the Determination of Alpha-Cellulose. William R. Willets. Paper Trade J. 92, No. 8, 117 (Feb. 19, 1931).—The procedure is essentially that of Method IV of the American Chemical Society. (Ind. Eng. Chem., Anal. Edit., 1, 54 (Jan. 15, 1929), with the following minor modifications: (1) the use of 95% ethanol or methanol followed by petrolic ether or other non-reacting volatile liquid for washing the alpha-cellulose after the final treatment with hot water is recommended to facilitate drying; (2) the determination of residual lignin (by the Madison Forest Products Laboratory method) in the alpha-cellulose is recommended for unbleached pulps.—A. P.-C.

Recent Advances in the Chemistry of Cellulose in Relation to Pulp and Paper. C. J. J. Fox. World's Paper Trade Rev. 95, 374, 376, 420, 422 (Jan. 30), 462, 464, 518, 520 (Feb. 6, 1931).—An address, dealing with the bearing on pulp and paper making of recent investigations on the chemistry and physics of cellulose, more particularly as regards its structure.—A. P.-C.

Ligno-Thioglycolic Acid in Spruce Wood. Broe Holmberg. Svensk Pappers- Tidn. 33; 679-86 (1930). The author describes in detail the method of preparing the extracts and isolating the acid. Although 17 samples of wood from various localities and of different age were used no significant differences were found in the results. Analysis averaged C, 55.29 per cent; H., 5.27 per cent; O., 29.49 per cent; S., 9.95 pe cent; and CH30, 11.46 per cent corresponding to the empirical formula $C_{40}H_{46}O_{22}$. 3.11 $HSCH_2COOH$. Previous results have indicated 4 mols of the acid to 1 of the carbohydrate.—C. E. P.

Concerning Alpha and Beta Lignin Sulphonic Acid. Eric Hagglund. Wochbl. Papierfabr. 61 Special No., 73-77 (June 25. 1930) .—The so-called beta lignin is not present in spruce wood. It occurs first by heating the wood with solutions of (sulphite) acid. The (bisulphite) sugar compounds and the lignin sulphonic acids form an oxydo reduction system whereby the first acts as donator and the latter acts in part as acceptor of the hydrogen. Thereby, as end product, are on the one side glucose acid and on the other side the formation of lignin sulphonic acid incapable of being precipitated, with aromatic amines. The latter probably contains an alcohol instead of the aldehyde group. Only a part of the lignin sulphonic acid in sulphite cooking liquor can be precipitated out by the addition of salts. The quantity which can be precipitated out depends on the cooking conditions. The part of the sulphonic acid precipitated out contains an hydroxyl instead of a methoxyl group, according to the author. Cooking acid weak in calcium oxide does not precipitate out as much lignin sulphonic acid as cooking acid high in calcium oxide content.—J. F. O.

Method of Determination of the Chlorine Demand of any Water. D. K. Pattillo and F. D. West. Paper Mill 54, No. 5, 4 (Jan. 31, 1931).—Chlorine demand is defined as the amount of chlorine that will combine chemically or possibly biologically or bacteriologically with any given water, white water or sewage to so change the state of oxidizable matter that it will not require additional oxygen. The method consists essentially in titrating 500 cc. of the sample with a hypochlorite solution containing 0.0001 g. available chlorine per cc. until a blue color is obtained with iodized starch solution used as outside indicator, adding a further slight excess of chlorine, and then determining the residual chlorine with a standard colorimetric chlorinetesting outfit.—A. P.-C.

White Water in the Pulp and Paper Industry. Zellstoff Papier. 10 No. 6; 400-402 (June, 1930).—The author first classifies the kinds of white water with relation to their source. The various processes for the utilization of the white water is reviewed.—J. F. O.

Specialties

Carbon Paper Coating Machine and Process. Jacob A. L. Möller. U. S pat. 1,772,553, Aug. 12, 1930.—The object of the invention is to provide a machine in which the degree of penetration of the "dope" or transfer material into the transfer sheet may be controlled. For this purpose heating and cooling rolls are provided, and are mounted so that their position can be adjusted to determine both the time interval in which primary penetration takes place, and also the temperature of the paper and transfer material during the primary penetration period.—A. P.-C.

Carbon Papers, Etc. P. Meyer, Brit. pat. 338,673.—A coating composition for carbon papers and manifolding or transfer forms consists of a water-soluble soap mixed with and boiled with sufficient water to make a stiff paste, and after cooling 1 part of dye is stirred in, the mixture being applied to a transfer form; for carbon papers, 8 parts of soap and 3 of dye are similarly mixed. A small proportion of oil may be added to prevent cracking due to heat if rolls are used in the coating operation. The composition may be applied by spraying, whereby a relatively thin coating can be determined for transfer forms, and stencils can be used to localise the coating. Copies made with the composition can be moistened to obtain additional copies.—A. P.-C.

Coating Paper with Wax. A Green. Brit. pat. 335,968.—Apparatus for coating paper with wax comprises a heated drum to which a regulated supply of wax is applied by a roller dipping into heated wax. The paper is passed over or around the drum and pressed against it by adjustable pressure rollers, and is then passed to cooling drums.—A. P.-C.

Paper Tubes. A. Lloyd and Bakelite, Ltd. Brit. pat. 334,959.—In the manufacture of tubes, rods, etc., by winding upon a mandrel paper inpregnated with a thermo-plastic material, such as a phenol-formaldehyde condensation product, the tube is covered during the final process of heating to convert the thermoplastic material into its infusible form by a flexible binding such as tape. This binding, which is preferably of a porous nature, supports the tube while pressure is applied thereto by expansion of the mandrel and also permits the escape of any gases evolved during the heating.—A. P.-C.

Method and Apparatus for Saturating Roofing Felt. Lester Kirschbraun assignor to The Patent and Licensing Corp. U. S. pat. 1,762,336, June 10, 1930.—The felt is led around a series of perforated pipes which supply a low-melting point (about 100° to 150°F.) asphalt heated to about 425°F. Alternating with the asphalt-delivering pipes are pairs of press rolls between which the sheet is passed to work the asphalt thoroughly into the fibrous body of the sheet. From the last pair of press rolls the sheet is passed through a bath of high-melting asphalt which coats the sheet while it is substantially at the temperature of the low-melting asphalt; it is then led over a series of drums maintained at a somewhat lower temperature, but above the melting-point of the high-melting asphalt. After cooling the sheet still further by passing over a series of looping rolls, it is reheated by the application of high-melting asphalt heated to a relatively high temperature, and this is followed by further treatments with molten asphalt at successively lower temperature.—A. P.-C.

Roofing and Method of Making Same. Lester Kirschbraun assignor to The Patent and Licensing Corp. U. S. pat. 1,763,601, June 10, 1930.—The object of the invention is to provide a relatively light weight, thick butt, tapered, flexible roofing element. It is produced by applying and uniting to a surface of flexible roofing sheet granular material in spaced areas. The sheet is then folded and the opposed faces of both the sheet and the granular material are united by means of an adhesive. The application of the granular material to a surface of the unfolded sheet is carefully regulated to concentrate it in the interior of the folded sheet in greatest amount adjacent the folded edge so as to produce a thick-butt tapered element. The folded sheet is immersed in suitable waterproofing material to coat all edges and surfaces and form an impervious enveloping coating.—A. P.-C.

Freeport Sulphur Joins TAPPI

Sulphur, because of its peculiar chemical, physical and electrical properties, lends itself most readily to a wide variety of uses, is one of the outstanding industrial necessities, and is the foundation of the chemical industries. The use of sulphur as a basic commodity in the pulp and paper industry is well known. It is therefore natural to expect that the outstanding companies in this industry would associate themselves with the paper mill superintendents,' engineers' and chemists' own organization, the Technical Association of the Pulp and Paper Industry. The company most recently to become a member is the Freeport Sulphur Company, whose executive offices are located at 122 East 42nd Street, New York, N. Y.

Many changes have taken place in the sulphur industry in recent years, the greatest being the rise of the United States from an unimportant position in 1903 to one of complete dominance at the present time. Prior to 1903 Sicily exercised a complete monopoly of the sulphur business of the world but in that year the Louisiana deposit became productive with the result that in less than ten years thereafter, the American production was more than double that of Sicily.

There are several reasons for the rapid increase in sulphur consumption, one of the most important being the relatively low, stable price. Prior to 1869 the greater part of the sulphuric acid manufactured was made from sulphur but with the increased prices instituted by the British monopoly of Sicilian production, the sulphuric acid manufacturers substituted iron pyrites as a cheaper raw material.

At the present price of $18 f. o. b. cars mine, there are no economies to be effected by using any other raw material, except in certain isolated cases, and the native sulphur is much more easily handled. Iron pyrites imported from Spain contains about 48 per cent sulphur, but the use of pyrites necessitates the payment of heavier freight charges and the handling of a large residue of little value, while sulphur produced by the Frasch process is usually over 99.95 per cent pure. At the present time sulphur is being produced at the rate of more than two millions tons annually, of which more than 250,000 long tons are used in pulp and paper manufacture.

The Freeport Sulphur Company is a part of the Freeport Texas Company, which was the first of the Texas sulphur producers, and together with one other company controls more than 95 per cent of the American supply and over 85 per cent of the world production. The Freeport Sulphur Company was incorporated in Texas in 1912 and began operations in that year. The company owns about 10,000 acres of land in Brazoria County, Texas, including the Bryanmound sulphur deposit of 786 acres and about seven miles of water front property located on Freeport harbor. In 1922 the Freeport Sulphur Company entered into an agreement with the Texas Company whereby the Freeport Sulphur Company toow over the right, title and interest which the Texas Company had in the sulphur deposit at Hoskins Mound and has since been utilizing this additional source of sulphur which is producing over one half million tons of sulphur annually.

At the Bryanmound is located a boiler plant of 16,800 horsepower which can be operated at twice this capacity and is designed to consume oil or gas. The daily consumption of natural gas is 24,000,000 cubic feet. About 7,500,000 gallons of specially treated water are used daily.

Eugene L. Norton is president of the Freeport Sulphur Company and Roy B. Johns is sales manager. The company will be represented in the Technical Association of the Pulp and Paper Industry by J. T. Claibourne, Jr., assistant secretary and assistant treasurer.

American and British Pulp Testing Methods*

By H. W. Laymon [1]

The Pulp Evaluation Committee of the Technical Section of the Paper Makers' Association of Great Britain and Ireland, has performed some fine work in reviewing pulp testing methods in use in various countries and proposed by various workers in the pulp and paper industries and in performing the large number of experiments, which led to the development of a set of equipment and the selection of a method which ultimately was adopted as standard by the Paper Makers' Association, (British).[2]

The laboratories of the Mead Corporation purchased from the British Association a complete set of its standard equipment for carrying out strength tests on pulp. A marx-Elemdorf Tearing Tester and a Schopper-Dalen Bursting Tester were also obtained.

The results given in this paper are the outcome of work done to compare our present method with the British standard method which for the sake of brevity we will term the "Mead" and the "British" methods respectively.

This work has not been carried out as far as it should be and it was unfortunate, as afterwards proved, that the Schopper burst tester had been used exclusively for the British method and the Mullen for the Mead method. It was desirable to have a report for this meeting of the Technical Association, however, so we have pleasure in presenting the facts so far available.

Space will not be taken to describe either the British Standard,[3] the Mead,[3] or the proposed TAPPI.[4] Methods, which may be found in the literature. They are however, fundamentally the same, varying only in detail, and the Mead and proposed TAPPI methods are practically identical.

Calibration of Test Instruments

The Marx and Thwing Elmendorf tearing testers were calibrated and correction curves drawn so that the readings obtained could be corrected to the exact force in grams required to tear a single sheet.

It was found necessary to use three sheets as a basis for the Marx tearing test (instead of six as recommended by the makers) to get the two tearing testers to agree. Further tests indicated that the Thwing instrument was calibrated correctly, so we used the three sheet basis for the Marx tester in the following work.

The gauges on the bursting testers were calibrated by the dead weight method. In attempting to correlate tests on the two instruments, (Mullen and Schopper) however, we obtained unexpected and surprising results. At low readings (15 pounds) the two testers gave results in close agreement, but there was a constant increasing difference until at high (80 pounds) readings the Mullen test was very much higher than the Schopper test. Recently published papers which were read before the Papermakers' Assn. in England report similar results.[5] [6]. We have not yet been able to satisfactorily explain this difference, but are doing further work on the subject. If any reader has had any experience of this nature, we, or the Pulp Testing Committee would greatly appreciate such information.

Relation of Test Results by the Two Methods and Uniformity of Results

The first thing we desired to find out was whether there was a consistent or definite relation between results obtained by the two methods on different pulps. While we were obtaining this, we could also record test data in such a manner that the uniformity of results could be compared.

A series of tests, therefore, were made on several different grades of pulp. All the pulps received a preliminary treatment in a laboratory refiner similar to a miniature jordan, before being made into sheets, except where otherwise specified. (Samples 101, 102, 401, and 402 were unrefined).

In Table I, the figures called "burst ratio" are obtained by dividing the "Mead" numerical burst results or "test" by the "British" burst test. The tear ratio was obtained in the same manner using the tear tests for calculating.

Burst and tear "factors" or "test" as recorded in the tabulated data, are obtained by dividing the burst or tear instrument readings by the basis weight and multiplying by 100. ("Mead" basis weights are pounds per ream 25x40—500—"British" basis weights are grams per square meter).

Percentage maximum variation is determined by dividing the difference between the average test and the individual test farthest from the average on a given sample, by the average test and multiplying by 100. To obtain the percentage average variation, the difference between each individual test and the average test is calculated. The average of the results so obtained is calculated in terms of a percentage of the average test.

The work of making the tests which are tabulated below was performed by a laboratory assistant, a high school graduate who was selected because of his careful and efficient work and because of considerable experience which he has had in pulp testing work in our laboratory. His work was under the immediate supervision of one of our technical service men who is a graduate chemical engineer. These conditions are such that they could be duplicated with reasonable care on a routine testing basis.

Comments On Data as Tabulated

Slush sulphite produced some variations in results from sample to sample as well as variations in test on different portions of the same sample. In the main, however, the results are fairly consistent and indicate a constant relationship between the results obtained by the two methods.

The average variation (or deviation as it is often expressed) on the eight samples of slush sulphite are as follows:—

	Burst per cent	Tear per cent
British	3.2	2.2
Mead	4.6	3.6

This shows an advantage for the British method, indicating a more uniform sheet formation.

Six portions each of samples 6, 7, and 8 were tested to determine how the two methods compare in their ability to duplicate results on the same sample. In the tabulation these portions are designated by a letter attached to the number (6A, 6B, 6C, etc.).

In order to get another comparison, average variations are also figured on these groups using the test results on the different portions of the same same.

These results are as follows:—

		Burst		Tear	
		British	Mead	British	Mead
Average variation,	No. 6....	1.94	2.73	3.86	0.87
	No. 7....	1.95	1.36	1.59	1.82
	No. 8....	1.64	2.41	1.07	1.39
Grand average		1.84	2.17	2.17	1.36

These figures do not indicate any decided advantage in uniformity in test results for either method.

The advantage of more uniform sheet formation indicated by the individual burst and tear tests did not carry through when it came to comparing the completed test results, (Which are averages of a number of the individual tests in each case).

Old Paper Stock (Samples 201 to 205).

On five samples of deinked book stock the average variation was as follows:—

	Burst per cent	Tear per cent
British	4.0	3.4
Mead	3.7	4.2

TAPPI Section, Page 348

* Presented at the annual meeting of the Technical Association of the Pulp and Paper Industry, New York, N. Y., Feb. 17-19, 1931.
Contribution of the Pulp Testing Committee.

[1] Member TAPPI, The Mead Corporation, Chillicothe, Ohio.

If the burst results are balanced against the tear results, there is almost exactly the same degree of uniformity shown by the two methods.

Slush Soda (Samples 301 to 306)

Six samples tested—average variation:

	Burst per cent	Tear per cent
British	2.7	2.4
Mead	3.6	3.3

Here as in case of the slush sulphite the British method shows a superior uniformity.

Six portions of sample 306 (306A, B, C, D, E, F) were tested as in case of the sulphite.

Comparing test results on the different portions we arrive at the following average variation data:

	Burst per cent	Tear per cent
British	1.88	1.04
Mead	1.49	2.19

In this comparison the British method on the whole shows a slight advantage. The Mead method, however, gave slightly more uniform burst tests.

Baled Bleached Sulphite

Only two samples of three portions each were tested. They were unrefined and received only the disintegration as is provided by the different methods. These samples (101 A-B-C and 102 A-B-C) and the dry soda samples. (401 A-B-C and 402 A-B-C) are the only ones covered in this report which are affected directly by the disintegration equipment, since the others have had an additional refining.

TABLE 1

		British						Mead							
		Burst			Tear			Burst			Tear				
Sample No.	Grade	Test	Max. Var. %	Ave. Var. %	Test	Max. Var. %	Ave. Var. %	Test	Max. Var. %	Ave. Var. %	Test	Max. Var. %	Ave. Var. %	Burst Ratio	Tear Ratio
1	Slush Bl. Sulphite	37.6	4.5	2.5	83.0	3.0	2.0	83.3	6.3	3.4	181.0	5.2	2.4	2.21	2.18
2	"	42.2	9.1	2.8	92.5	5.0	2.6	96.0	4.2	4.9	181.0	5.2	2.4	2.27	1.84
3	"	40.0	5.6	3.1	91.0	3.5	2.3	97.5	10.0	5.5	165.0	6.2	4.1	2.42	1.82
4	"	41.3	4.2	2.2	86.0	3.8	1.9	99.0	9.4	4.1	172.0	10.7	6.2	2.40	2.00
5	"	41.0	6.3	2.4	90.0	1.8	0.9	90.5	13.5	5.5	170.0	4.1	2.3	2.20	1.89
6	"	42.2	8.7	3.9	87.4	4.9	3.5	97.9	8.4	3.9	172.0	6.4	3.4	2.32	1.96
7	"	41.1	10.6	4.3	87.8	4.9	2.7	95.6	9.2	4.3	157.0	6.8	2.7	2.33	1.78
8	"	42.6	10.1	4.0	84.3	3.7	2.0	96.6	13.2	4.8	158.0	6.5	2.7	2.27	1.87
Average		41.0	7.4	3.2	87.8	3.8	2.2	94.6	9.3	4.6	168.0	7.2	3.6	2.30	1.92
6 A	Slush Bl. Sulphite	42.8	7.3	4.1	81.5	6.5	5.8	102.0	6.5	2.9	170.0	5.9	3.6	2.39	2.08
6 B	"	43.4	8.4	3.2	85.5	4.1	3.5	100.0	10.5	4.1	175.0	5.5	3.3	2.30	2.02
6 C	"	41.4	10.8	2.9	85.5	3.9	2.5	96.0	7.7	3.4	170.0	5.8	3.5	2.32	1.99
6 D	"	42.7	8.5	5.6	88.8	5.7	3.4	96.0	11.3	6.5	172.0	5.4	3.6	2.24	1.94
6 E	"	40.5	12.2	4.4	96.3	5.2	3.0	100.0	8.1	3.3	171.0	9.5	4.4	2.47	1.78
6 F	"	42.3	5.0	3.3	87.0	3.8	2.6	94.0	6.1	3.5	173.0	6.2	2.9	2.22	1.98
Average		42.2	8.7	3.9	87.4	4.9	3.5	97.9	8.4	3.9	172.0	6.4	3.4	2.32	1.96
7 A	Slush Bl. Sulphite	40.6	8.5	3.2	87.0	4.3	2.2	96.2	10.9	7.0	158.0	7.7	3.6	2.37	1.82
7 B	"	39.7	15.3	6.6	88.6	9.6	4.6	84.2	6.6	2.6	158.0	6.3	2.7	2.37	1.78
7 C	"	40.6	11.8	5.3	86.2	4.6	3.0	94.3	15.0	5.9	160.0	5.1	2.3	2.32	1.85
7 D	"	41.1	7.1	2.9	86.3	1.8	1.0	98.5	10.6	3.6	160.0	3.4	1.3	2.40	1.85
7 E	"	42.8	13.2	5.1	89.0	3.8	2.0	96.1	6.9	4.1	153.0	12.5	4.1	2.25	1.72
7 F	"	41.9	7.7	2.8	90.0	5.3	3.3	94.5	5.0	2.4	152.0	5.6	2.3	2.25	1.69
Average		41.1	10.6	4.3	87.8	4.9	2.7	95.6	9.2	4.3	156.8	6.8	2.7	2.33	1.78
8 A	Slush Bl. Sulphite	42.3	10.2	5.8	85.5	4.5	2.2	99.0	8.6	3.3	159.0	6.6	3.9	2.34	1.86
8 B	"	42.2	9.1	3.6	83.6	3.9	2.9	94.0	16.6	4.8	160.0	7.5	2.0	2.24	1.91
8 C	"	43.3	10.7	3.3	84.5	4.5	2.0	93.0	14.6	5.9	158.0	6.3	2.2	2.14	1.86
8 D	"	42.5	8.6	4.1	85.5	1.3	.8	98.0	9.6	4.4	160.0	7.0	2.6	2.29	1.87
8 E	"	41.2	11.6	3.5	82.5	3.5	1.8	100.0	13.4	5.3	154.0	6.5	3.8	2.43	1.87
8 F	"	43.9	10.2	3.8	84.0	4.5	2.1	96.0	16.4	5.3	154.0	5.2	1.9	2.19	1.83
Average		42.6	10.1	4.0	84.3	3.7	2.0	96.6	13.2	4.8	157.5	6.5	2.7	2.27	1.87
101 A	Baled Bl. Sulphite	18.7	7.7	4.7	108.0	6.0	3.5	34.8	3.1	1.1	221.0	6.7	3.1	1.86	2.04
101 B	"	18.7	10.4	3.5	106.0	4.3	3.2	33.2	11.0	5.3	234.0	5.7	3.0	1.77	2.27
101 C	"	19.4	9.5	3.4	108.0	7.0	4.3	35.3	11.7	3.9	229.0	13.9	3.8	1.82	2.12
Average		18.9	9.2	3.9	107.0	5.8	3.7	34.4	8.6	3.4	228.0	8.8	3.3	1.82	2.13
102 A	Baled Bl. Sulphite	19.2	25.4	5.7	93.0	8.3	4.2	34.2	13.5	6.0	238.0	9.9	5.4	1.78	2.56
102 B	"	19.4	9.3	4.5	113.0	9.2	2.0	33.1	19.5	7.7	234.0	7.9	4.0	1.71	2.06
102 C	"	21.2	51.0	13.7	97.0	6.0	3.4	32.7	20.4	7.5	241.0	13.0	7.1	1.54	2.49
Average		19.9	28.6	8.0	101.0	7.8	3.2	33.3	17.8	7.1	238.0	10.3	5.5	1.68	2.37
201	Old Paper Stk.	21.4	6.1	3.0	48.0	3.8	3.8	47.4	4.0	2.1	99.0	7.8	4.4	2.21	2.06
202	"	22.0	8.8	3.1	47.7	4.1	2.5	54.0	7.8	3.6	91.0	15.6	8.9	2.45	1.90
203	"	23.2	8.0	4.3	50.0	10.0	5.0	55.5	6.0	4.1	92.0	5.7	2.4	2.39	1.84
204	"	20.9	8.6	5.1	42.5	3.2	1.2	51.0	7.1	4.5	99.0	7.0	2.9	2.44	2.33
205	"	22.3	8.3	4.3	49.5	7.1	4.6	50.7	10.2	4.1	91.0	4.9	2.2	2.27	1.84
Average		21.9	8.0	4.0	47.5	5.6	3.4	51.7	7.0	3.7	94.4	8.2	4.2	2.35	1.99
301	Slush Bl. Soda	36.4	1.5	0.3	67.4	5.2	2.9	72.7*	10.6	4.3	121.0	7.3	3.9	2.00*	1.80
302	"	35.1	13.5	3.8	66.0	1.7	1.0	93.5	5.4	3.2	116.0	3.9	1.3	2.66	1.76
303	"	37.8	5.1	2.5	70.5	3.5	1.6	102.0	8.2	3.7	137.0	10.1	5.3	2.66	1.96
304	"	35.0	3.6	2.1	76.0	6.4	4.3	97.0	9.6	5.3	143.0	10.1	4.7	2.77	1.88
305	"	36.0	5.5	2.8	68.0	4.9	2.4	93.0	8.2	3.3	116.0	2.9	1.5	2.58	1.71
306	"	34.5	12.1	4.6	62.6	4.6	2.5	93.8	4.1	1.8	114.0	7.5	3.0	2.72	1.82
Average		35.8	6.9	2.7	68.4	4.4	2.4	95.9	7.7	3.6	124.5	7.0	3.3	2.68	1.82
306 A	Slush Bl. Soda	34.2	12.2	5.8	62.5	2.8	1.9	93.5	5.0	1.3	116.0	8.0	3.5	2.82	1.86
306 B	"	34.5	11.2	3.3	62.0	4.0	2.2	94.2	4.2	2.5	113.0	10.4	3.1	2.73	1.82
306 C	"	35.7	10.2	2.8	62.0	3.1	2.3	90.8	2.7	1.3	115.0	7.8	3.3	2.54	1.85
306 D	"	35.1	8.5	2.6	64.2	4.8	2.5	94.9	5.1	1.7	119.0	4.3	2.1	2.70	1.85
306 E	"	32.4	16.8	7.4	62.0	4.9	3.4	93.7	4.3	2.9	110.0	6.1	2.9	2.89	1.77
306 F	"	35.2	13.6	5.7	63.0	8.0	2.6	92.5	3.0	1.2	112.0	8.1	3.0	2.63	1.78
Average		34.5	12.1	4.6	62.6	4.6	2.5	93.8	4.1	1.8	114.0	7.5	3.0	2.72	1.82
401 A	Dry Soda	12.6	13.0	5.8	38.2	4.9	2.4	36.8	13.4	4.9	107.0	11.1	4.9	2.92	2.80
401 B	"	11.6	16.6	6.1	43.7	8.8	6.1	37.1	14.3	3.7	111.0	8.2	5.0	3.20	2.54
401 C	"	13.2	17.7	7.2	41.0	4.8	1.2	36.0	11.9	7.2	108.0	12.0	5.6	2.75	2.62
Average		12.5	15.8	6.4	40.9	6.2	3.2	36.6	16.5	5.3	108.7	10.4	5.3	2.95	2.65
402 A	Dry Soda	5.6	64.5	21.5	33.6	6.1	3.5	22.5	15.7	8.1	82.5	16.7	7.1	4.00	2.45
402 B	"	7.6	62.0	32.4	38.2	15.5	6.7	29.4	12.5	3.6	90.0	13.7	5.6	3.87	2.36
402 C	"	8.5	45.7	22.9	35.6	6.9	3.9	27.2	16.0	8.1	88.2	12.0	5.3	3.20	2.48
Average		7.2	57.4	25.6	35.8	9.5	4.4	26.4	14.7	6.6	86.9	14.1	6.0	3.69	2.43

* Not used in calculating averages.

Tests on only two samples are hardly enough to safely draw conclusions upon but if we compare them for uniformity as we have done with the previous tests we find average variations on tests as follows:

	Burst per cent	Tear per cent
British	6.0	3.5
Mead	5.3	4.4

As a whole a very slight difference in uniformity is evident.

Comparing in this manner the ability to duplicate results on the same sample we find:

	Burst per cent	Tear per cent
British	2.89	2.79
Mead	1.99	1.52

The Mead results in this case check a little closer than the British.

Dry Soda Pulp

Only two samples of three portions each (401 A-B-C and 402 A-B-C) of this grade of pulp were comparatively tested. They were unrefined as in the case of the Baled Sulphite.

Sample 401 gave better test results than 402 which was a much weaker pulp. A weak, free, unbeaten pulp is difficult to test and obtain uniform results, as the figures strikingly show.

Uniformity results on sample 401 comparing individual results are:

	Burst per cent Avg. Var.	Tear per cent avg. variation
British	6.4	3.2
Mead	5.3	5.3

This favors Mead on the burst test and British on the tear test.

Comparing completed test results on different portions of the sample:

	Burst per cent Avg. Var.	Tear per cent avg. variation
British	4.24	4.57
Mead	1.17	1.47

This shows a decided advantage for the Mead method. It must be bourne in mind, however, that the number of tests are very small to draw conclusions from.

The tests on sample 402 are very interesting:—

Per cent variations on individual tests are:—

	Burst per cent	Tear per cent
British	25.6	4.4
Mead	6.6	6.0

Percent variations from test to test:

	Burst per cent	Tear per cent
British	14.9	4.4
Mead	9.8	3.3

Reason for Variations

The reason for the large variations is that in a weak pulp, the tests fall so low on the scale of the testing instruments, particularly the bursting testers, that they are inadequate and unreliable. The sheets by the British method are much lighter than by the Mead method, and therefore the condition we are discussing is greatly magnified. In the case of sample 402 these conditions make the Standard method using the Schopper bursting tester entirely unsuited for evaluation purposes. This is strikingly evident to any one endeavoring to test sheets bursting much below 10 pounds per quare inch with the Schopper-Dalen intrument (at least when equipped with diaphragm as supplied by the makers and with an 80 pound gauge.) In fairness to the results obtained with the British method, however, we should consider that no doubt at the other end of the strength range, conditions would be reversed and the Mead method not so suitable because the sheets would be too heavy. Unfortunately at the present time we have no comparative results on kraft or other very strong pulps. A Mullen tester with a low range gauge, or a Schopper tester more suited to weaker papers also would probably give more favorable results than those here obtained using the standard method for these weak pulps.

Summary of Uniformity Comparisons

To summarize the uniformity comparisons the following tabulated average results are given.

Average precent variation in tests from which the test result or "factor" is calculated.

	Burst		Tear	
	British	Mead	British	Mead
Slush Sulp. Bl.	3.2	4.6	2.2	3.6
Old Paper Stock	4.0	3.7	3.4	4.2
Soda Pulp Slush	2.7	3.6	2.4	3.3
Bale Sulp. (Unref.)	6.0	5.3	3.5	4.4
Dry Soda (Unref.) (Sample 402 not included)	6.4	3.2	3.2	5.3
Grand Average	4.5	4.1	2.9	4.2

These results are as we expect because very well formed sheets are produced by the British method. Experimental results confirm the visual observation that these sheets are more uniform in formation than the Mead sheets.

However, when the individual "bursts" and "tears" are averaged for the test result, this advantage seems to be lost. In other words there are enough tests made for the average to compensate for the lesser uniformity of the Mead sheets. This is shown by the following table:

Average percent variation in test results on different portions of the sample.

	Burst		Tear	
	British	Mead	British	Mead
Slush Sulphite	1.84	2.17	2.17	1.36
Old Paper Stock—No tests.				
Soda Slush	1.88	1.49	1.04	2.19
Bale Sulp. (Unref.)	2.89	1.99	2.79	1.52
Dry Soda (Unref.) (Sample 402 not included)	4.24	1.17	4.57	1.47
Grand average	2.71	1.71	2.64	1.64

It is hardly fair to average all these tests together in this manner, but if we take the Sulphite and Soda Slush samples (on which enough tests were made to make better comparisons than on the others) we find the uniformity of both methods almost exactly equal.

It is also quite possible that our long practice in the use of the Mead method is somewhat of a disadvantage in comparing the Standard method which is somewhat new to us, although sufficient tests have been made with it to have gained some measure of familiarity.

Relation of Test Results of Mead and British Methods

Taking average figures from the tabulated data we have test "ratios" as follows:

	Burst Ratio	Tear Ratio
Slush Sulphite	2.30	1.92
Old Paper	2.35	1.99
Slush Soda	2.68	1.82
Dry (Baled) Sulphite (Unrefined)	1.80	2.25
Dry Soda (Unrefined) (402 not included)	2.95	2.65

On the refined slush pulps, the ratios are fairly constant, but the burst ratio on soda is somewhat out of line with the rest. A suggested reason for this is that the bursting test is quite sensitive to sheet formation, and a poor or uneven formation leaves spots of low resistance which produce low bursting tests. Better formed sheets are made on the Mead machine from soda pulp than from sulphite, so the Mullen test on soda would be expected to be relatively higher than sulphite and consequently the burst "ratio" should be higher. Old Paper stock makes sheets having a good formation but it contains some filler which lowers the Mullen tests and this may be the reason why its "ratio" is nearer to that of sulphite. The soda tear "ratio" is a little lower than that of the other refined pulps, which is probably also a function of formation since a well formed sheet does not give as high a tear test as one not quite so perfectly formed.

The unrefined dry stocks give widely varying results. Without more tests we probably can conclude no more than that stocks of such widely differing characteristics will not produce proportionate results by the two methods.

To complete this correlation, more tests will have to be run on refined and unrefined dry sulphite and soda, and the same bursting equipment used in both methods.

On some of the tests made by the British method, only 10 or 12 burst tests were made (instead of 18 as specified in the method). The degree of uniformity of results with those tests was as good as of those made with the full number so we did not feel that they should be discarded.

General Comments and Comparative Characteristics

From the data presented herewith it would seem that both methods give good results and that results can be duplicated on

separate portions of the same sample with a satisfactory degree of accuracy. In the tabulated data every test made was recorded, and no test results whatever were discarded, so the picture is complete and not distorted.

The sheets made by the British method are small and six sheets must be made for each sample instead of four, as with the Mead method. Additional drying rings and polished plates must be procured if more than 24 sheets are to be made in the same day, since a ring and a plate is necessary for each sheet made. The number of sheets made daily therefore limited to the number of rings and plates available.

Due to the light weight sheets a tearing tester such as the Marx-Elmendorf tester, lighter than the Elmendorf tester which is in general use in this country must be used, or else an excessive number of test sheets would have to be made. (We understand that the Thwing Instrument Co., of Philadelphia, Pa., is now in a position to supply these lighter instruments.)

The operation of the British method is comparatively slow, time studies showing that twice as many samples can be tested in a given time with the Mead as with the British method.

The standard method however was developed with the idea of precision and not production. The Mead method was developed as a routine method with the production thought combined with a reasonable degree of accuracy.

There are some outstanding facts in favor of the British Standard Method as follows:—

It is the only method which has actually been adopted as standard by any country.

It is the only complete set of equipment for pulp testing which has been worked out and specified in minute detail so that any good equipment maker or machine shop can duplicate it exactly.

Arrangements are being made to have the British Standard equipment made in this country and if adopted as standard, it will be easy to acquire complete. The user would not be faced with the problem of buying a press here, disintegrating equipment there and a sheet machine from some other place and wondering if he would then get the same results as the other fellow.

If T.A.P.P.I. and the Canadian Technical Section should adopt the method and equipment it would be a long step toward an international standard.

For these reasons we feel that serious consideration should be given by T.A.P.P.I. to the idea of adopting the method in use as standard by the Paper Makers' Association of Great Britain and Ireland.

The author wishes to acknowledge the valuable services of Mr. E. D. Hunt and Mr. James A. Lucas of the Mead laboratory who did most of the actual work of calibrating the instruments and making and testing the sheets (numbering over 500) involved in this investigation.

Since the above work was done and comments made, there has been published by the Canadian Association, a report of work done on this same subject. Their conclusions were very similar to ours.[7]

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The Technician In The Paper Industry*

By Henry P. Carruth[1]

The paper industry ranks among those of long establishment, antedating the introduction of scientific methods by several generations. As a result of this situation it had built up an art of manufacture based upon skill and empirical methods long before the advent of the technician. This resulted in an antagonistic attitude, on the part of paper makers and paper mill executives, to the introduction of scientific methods and control which delayed by many years the adoption of modern methods.

This condition is well illustrated by the fact that as late as about 1910 an attempt to gather a list of paper mill chemists showed only a mere handful of names as candidates for a technical group. Civil and mechanical engineering, and later electrical engineering, were recognized at earlier dates as of more importance to the trade than was chemical engineering, presumably because the specific functions of these professions in the trade were recognized without interference with the art itself, whereas the chemist could only function by intrusion upon that art.

In full sincerity the paper makers of that time believed that the processes of manufacture and the properties of the product were not susceptible of chemical analysis or control; in fact, they were not recognized as being based upon a chemical or physical foundation. Raw materials were first studied, but results were slow to be obtained because of the lack of exact knowledge of the requirements due to processing, and products were tested only incompletely due to lack of proper equipment and methods and lack of specific accurate knowledge of consumer requirements.

In February, 1915, a meeting was called during the Annual Convention of the American Paper and Pulp Association looking to the formation of a group or association of paper mill technicians for the purpose of exchanging ideas. This meeting was called in a room of the old Waldorf Astoria and was attended by twenty-seven men, mostly unknown to each other. Henry Fletcher and W. G. McNaughton were I believe, the originators of the idea, but were strongly supported by Judge Moore. It is interesting to recall that at this first meeting, after listening for an hour to discussions of a strictly engineering character, I finally voiced the question as to whether or not the chemist was to be considered as a candidate for the group, as no word of chemistry had up to that time been mentioned, the discussion, as I remember it, having been confined exclusively to power. This question and the ensuing discussion developed the scope of the new association as pertaining to all of the technology of paper and pulp manufacture and use.

Progress Indications

The Technical Association of the Pulp and Paper Industry, which was born of this meeting, began with a membership of 201 in 1915. In the ensuing years it has grown, step by step, to the present membership of 1166. Not only does this increase indicate of itself a tremendous expansion of technical talent applied to our industry, but it is undoubtedly true that it reflects only a part of that growth, as it is a safe assumption that a very large number of technicians now employed in the in-

* Presented at the annual meeting of the Technical Association of the Pulp and Paper Industry, New York, N. Y., Feb. 17-19, 1931.
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dustry are not members of the Association. Membership alone, however, has little true significance in determining the values which have been created by this process of change. What is of more importance is the gradual change from an art to a science, which has been the real result. Not that it can be said that today the art of paper-making has become the science of paper-making, but certainly a very considerable change in this direction has been accomplished and each year we come closer to our goal.

The manifestations of this change are, of course, innumerable, but this discussion would be incomplete without mentioning at least a few of the more outstanding ones.

In the field of mechanics we have seen radical developments in machine design pertaining to almost every type of machine used in the industry, increased speed, along with larger units in paper machines, being one of the many illustrations. Improvement in methods of driving our equipment, electrification and the elimination of friction losses are notable.

The newer mills are housed in buildings finer in every respect than in the past. Not only are they larger, better built and better designed for their respective purposes, but also in architectural detail they have shown great improvement.

Notable is the thought that has been given to convenience, sanitation and proper lighting, and along with these improvements has come an appreciation of good housekeeping as an economic necessity.

Detailed studies of such subjects as the design of machine clothing, simplified piping layout, efficiency of pumps and proper lubrication, and many others, have brought economies and improvement of product.

Our major raw material—wood—has been the full time study of a group of technicians who have vastly improved our woods operations, particularly with reference to protection against fire losses, and along many other lines such as more scientific cutting and reforestation, the study of the adaptability of new species to our uses, and even in some degree the development of new species by hybridization.

Our industry is largely dependent upon power, and our technicians have been quick to bring to us, and to adapt to our uses, the rapid developments in this field which have been so noteworthy in the past few years. No longer is the shovel the insignia of the fireman, but today he appears as a Paderewski seated at the keyboard of his industrial piano, controlling with his finger tips the generation of steam in units the size of which are far greater than in the earlier days. The efficiency of these modern plants, both in labor and in utilization of the heating value inherent in the fuel, is almost phenomenal. In generation and use of electric energy, our industry has benefited from the services of its technicians, both directly and indirectly from their contacts.

Process Control and Research

In paper-making itself this influence has been profoundly felt. Old taboos have been removed, and clear understanding has taken its place. The chemistry of our processes has been defined and developed in a remarkable degree.

In no single field has scientific thought been more productive than in the elimination of waste. This subject has been attacked from every angle—labor wastes, material wastes, and energy wastes have all been studied in detail. One outstanding result has been in the gradual curtailment of effluent losses which before the advent of the technician were unappreciated in anything like their true importance. In turn, this improvement has carried in its train a decided betterment in the purification of the streams which receive these effluents.

Raw materials are today under far closer control than in the past and purchasing methods based upon accurate knowledge have largely replaced old methods where the personality of the salesman was often the determining factor.

Closer control of products has resulted from improved inspection methods and technical knowledge of consumer requirements has lead to improved production specifications, all of which has affected a decided betterment in our products and companies, who each year are turning out the ever-increasing requirements of the consumer.

A vast array of new paper products has come into existence as the result of laboratory effort, as well as new methods for producing them. At the time our Association was formed there was little research work of an organized character being conducted. Today the country is dotted with research laboratories, financed and operated directly by paper and pulp producing companies, which each year are turning out an ever-increasing flood of constructive ideas.

Problems to be Solved

In spite of these many achievements there remains a great deal to accomplish and the paper or pulp technician need have no fear that his usefulness is nearing an end.

Outstanding among our unsolved problems is the awful waste of organic material which takes place in our chemical pulping operations. The limited use now being made of this material is obviously insignificant not only as to amount recovered, but perhaps is even less satisfactory when considered from the point of view of the type of products developed in comparison with the much more valuable complex types which are potential from a consideration of the lignin complex as it originally exists in the wood.

Closely allied to this problem is the further development of knowledge of the actual constitution of wood and the various components which constitute it. Cellulose chemistry has not been standing still by any means, but a great deal remains to be accomplished. Personally, I look forward to a time when the non-cellulose portion of the wood will be considered the major product and pulp will be considered a by-product.

Better pulping methods will undoubtedly open up not only new sources of raw material, but products adapted to uses now unknown. In the past every important discovery in cellulose chemistry has resulted in the creation of new industries, many of major importance.

As we attempt to look into the future we can plainly see the field of the technician increasing in importance. Research in every field will continue on an ascending scale. Scientific control of raw materials, processes, machines and product will become increasingly important and necessary. Even in the merchandising field the engineering values involved are more and more appreciated.

This steady growth in the importance of the technician creates of itself another activity for him, that of management. Under empirical conditions, management of industry could well be left in the hands of men not trained in science. But when industry becomes, as it is fast becoming, a complex of all the branches of science, then it seems obvious that it must be guided by men capable of understanding the work of their subordinates and associates. The training and selection of men for such executive positions is, I believe, one of the major problems of the future. For such positions mere engineering knowledge is insufficient. Special qualities of character and temperament are essential and knowledge of such subjects as economics and psychology are of fully equal importance with scientific training. The young men in our technical schools are already over-burdened by the ever increasing accumulation of knowledge which must be absorbed and yet for the future executive this already over-loaded curriculum must be made to extend into those other fields which are of equal importance. The faculties of our technical schools and universities have here a very real and pressing problem which somehow must be solved, if we are to keep control of the complex civilization which we are all helping to create.

TAPPI Section, Page 352

The Paulson Acid Absorber*

By W. L. McCabe[1] and W. H. Swanson[2]

It is customary to classify sulphite acid-making systems on the basis of the raw material used. Thus, such systems are usually considered to be either limestone systems, where limestone rock is used; or as milk of lime systems, where hydrated lime, suspended in water, is used. The limestone systems are ordinarily called tower systems since they involve the use of tall columns packed with crushed limestone. The milk-of-lime systems are similarly often called tank systems, since the earlier examples of the method utilized series of tanks. It is by no means necessary, however, to use a tank system in the milk of lime methods, and from the chemical point of view, it is best to consider the methods used as either limestone or milk-of-lime systems.

In spite of complicating factors introduced by certain chemical reactions, all acid systems are, from the engineering point of view, essentially absorption systems, where sulphur dioxide is absorbed from its mixture with nitrogen and excess oxygen by means of a liquid. Accordingly acid systems are best analyzed and compared on the basis of the underlying principles of the unit operation known as gas absorption. The purpose of this paper is to present such an analysis, and to describe the Paulson method as a sound application of gas absorption principles to the problem of acid making.

General Methods of Gas Absorption

The most satisfactory means of carrying out a gas absorption process is to bring into intimate counter current contact the gas containing the substance to be absorbed, and the liquid chosen as the absorbing medium. By using a counter current method, a strong liquor can be obtained without leaving an appreciable concentration of the substance absorbed in the leaving gas. By insuring intimate contact, which means developing a large amount of surface between gas and liquid, the volumetric capacity of the apparatus can be made large, and the size of the equipment reduced. All recognized acid systems use counter current contact between liquid and solid, but differ in the means of developing large interfacial surface between liquid and gas.

There are two main methods of increasing the area of contact between the gas and liquid in gas absorption work. Both use columns where the liquid flows from top to bottom and the gas from bottom to top. The first method is to distribute the liquid in thin films by packing the tower with solid shapes that are designed to offer a large surface per unit tower volume and allowing the liquid to trickle through the packing. The second method is to subdivide the gas stream into small bubbles by means of a number of horizontal partitions that are either perforated or fitted with bubble caps. The liquid covers the partitions and passes from plate to plate by means of down-pipes. A typical bubble-cap plate is shown in Fig. 1.[3] In general, it can be said that the volumetric effectiveness of a plate column is much greater than that of a packed colume. This is due to the greater intimacy of contact, and the impossibility of channeling. Channeling is liable to occur in the packed column. The bubble cap construction is more advantageous than a perforated plate construction because of the greater flexibility, higher capacity, and because the liquid does not drain from the plates when the gas flow stops.

All of the foregoing contacting methods are represented in acid systems. The ordinary tower system, where water is allowed to trickle down over lumps of limestone and sulphur dioxide is sent upwards through the tower, is a packed column method of gas absorption. The method is unique, however, in that the tower packing, instead of being inert, takes part in the reaction and is constantly replaced. This change in surface does not bring about constant and effective contact, and is rather faulty from a gas absorption point of view.

Perforated Plates vs. Bubble-Caps

The Barker milk-of-lime system is an interesting combination of a perforated plate column and a packed column. The top of the tower consists of four sections of perforated plates, while the bottom is a packed column. The packed column is filled with inert packing, and therefore differs from the limestone tower method. This method, from a gas absorption point of view, is sound, although the perforated plate method and the packed column method are both inferior to the bubble cap method as far as intimacy of contact between liquid and gas is concerned.

The lack of flexibility of the perforated plate absorber is a serious drawback to this type of apparatus, since the depth of liquor on a perforated plate depends largely on the rate of gas flow through the holes. If the rate of gas flow varies, the liquor level varies, the draft on the sulphur burner changes, and control difficulties result. In starting, the liquor level on the plates must be built up, and in shutting down the plates drain themselves.

Actual equipment used in acid making must take into account certain other factors than straight gas absorption. The chemical reactions taking place involve solids as well as liquids and gases, and allowance must be made for these solids, which may appear as suspensions or sludges. When dolomitic limestone or lime is used, the differences in behavior between lime and magnesia are of importance

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* Presented at the annual meeting of the Technical Association of the Pulp and Paper Industry, New York, N. Y., Feb. 17-19, 1931.
Contribution of the acid pulping committee.
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[3] Badger and McCabe, "Elements of Chemical Engineering," McGraw-Hill Book Co. 1931. p. 315.

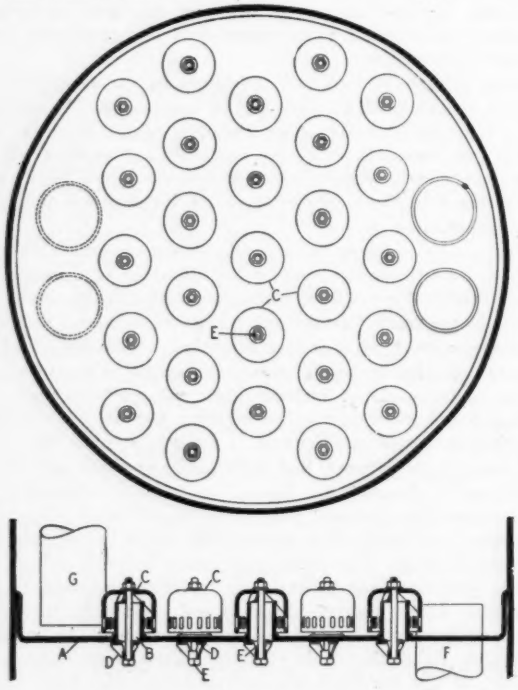

FIG. 1

Detail of Bubble Cap Column. A. Column plate. B. Vapor nozzle. C. Bubble cap. D. Spider. E. Holding-down bolts. F. Downtake pipes to plate below. G. Downtake pipes from plate above.

The mechanism of the reaction of the limestone system is essentially as follows:[4] Sulphur dioxide dissolves in the acid liquor, forming sulphurous acid. The acid attacks the limestone, forms calcium monosulphite, and liberates carbon dioxide. The monosulphite is quite insoluble, and is retained as a precipitate on the limestone lumps. It is attacked, however, by more sulphurous acid, and is finally dissolved as calcium bisulphite. Since the sulphur dioxide is present in excess, the final liquor contains free sulphurous acid in which calcium bisulphite is dissolved. The equations are:

$$SO_2 + H_2O = H_2SO_3$$
$$CaCO_3 + H_2SO_3 = CaSO_3 + CO_2 + H_2O$$
$$CaSO_3 + H_2SO_3 = Ca(SO_3)_2$$

In the milk-of-lime system, the action of sulphur dioxide on the hydrated lime precipitates calcium monosulphite, and the latter reacts with more sulphur dioxide to form calcium bisulphite. The reactions are:

$$Ca(OH)_2 + H_2SO_3 = CaSO_3 + 2H_2O$$
$$CaSO_3 + H_2SO_3 = Ca(HSO_3)_2$$

In case the limestone contains appreciable amounts of magnesia, the above reactions take place, with the substitution of magnesium for calcium. However, the solubilities of the magnesium compounds are different from those of the calcium compounds. Magnesium carbonate is less soluble than calcium carbonate, and if the limestone is dolomitic, the calcium carbonate is attacked more rapidly than is the magnesium carbonate, and the latter is carried along with the liquor as a sludge.[5] This is important in the operation of the carbonate systems on dolomitic limestones. On the other hand, magnesium monosulphite is more soluble[6] than is calcium monosulphite, and in the milk-of-lime systems, magnesium monosulphite does not precipitate to the same extent as does an equivalent amount of calcium monosulphite.

There is very strong evidence that dolomitic liquors are preferable to high calcium liquors.[7] The following abstract from Hitler[8] is of interest in this connection:

"Eckmann made his first commercial pulp with magnesium bisulphite. It was softer than Mitscherlich pulp produced with calcium bisulphite. Calcium was preferred only because it was cheaper. For this reason, the author investigated the use of dolomite as a base. In using dolomite in the Mitscherlich tower, there are difficulties because the Ca-Mg double salt dissolves very slowly in sulphurous acid. The slurry coming down clogs the tower. Jenssen was even forced to rebuild his towers at magnesium content of 8-10 per cent of the stone. From the chemical standpoint, the use of magnesium offers many advantages. The greater solubility of magnesium sulphite (100-160 times that of calcium sulphite) lowers the ash content of the pulp. Kirchner states that wood is more easily disintegrated with magnesium liquor. Wimmer (Pap. Fabr. 1926, page 234) says that rosin is more easily dissolved. Kurt Berndt (Pap. Fabr. 1926, page 234) thinks that magnesium liquor is of advantage. Bjarne Johnsen (The Manufacture of Sulphite Pulp, page 34, par. 56) says that magnesium bisulphite is decomposed slower. Therefore, a higher content of base can be used. It can be cooked faster and to a higher temperature. The pulp obtained is better. Schwalbe & Berndt (Pap. Fabr. 1924, p. 64, 1925, page 1 and 3, 1926 pages 250 and 561) tried to prepare magnesium bisulphite from chlorides and sulphates. They arrived at the following conclusions: Magnesium oxide is more easily soluble than calcium oxide. Both solutions show the same speed of oxidation. Calcium sulphite salts out faster on heating than magnesium sulphite. The wood absorbs the same amounts of acid and base. Trial cooks were carried out. They showed that with an increase of the magnesium content of the limestone, the correct operation of the cooking is easier. In presence of a great amount of magnesium, cooking can be carried out with a higher lime content without spoiling the cooks. E. Haegglund (Papier Fabr. 1926, page 449 and 483) investigated the use of magnesium salts, and emphasizes their advantages. This is confirmed by the statements of B. Johnsen. The author discusses the tests of Cross & Engelstadt (Papier Fabr. 1926, page 693) and comes to the conclusion that the magnesium salts check and prevent the reaction $3\,H_2SO_3 = 2\,H_2SO_4 + S + H_2O$. That this reaction takes place was proven by Haegglund. The magnesium salts, therefore, decrease the injurious H-ion concentration of the cooking liquor.

"The author draws the following conclusions: The chemical advantages of the Mg base are of great value. In the sulphite process we have the conserving influence of magnetism on the bisulphite. Cooking can be carried out at higher temperatures and faster. It is sufficient to replace ½ of the base by magnesium."

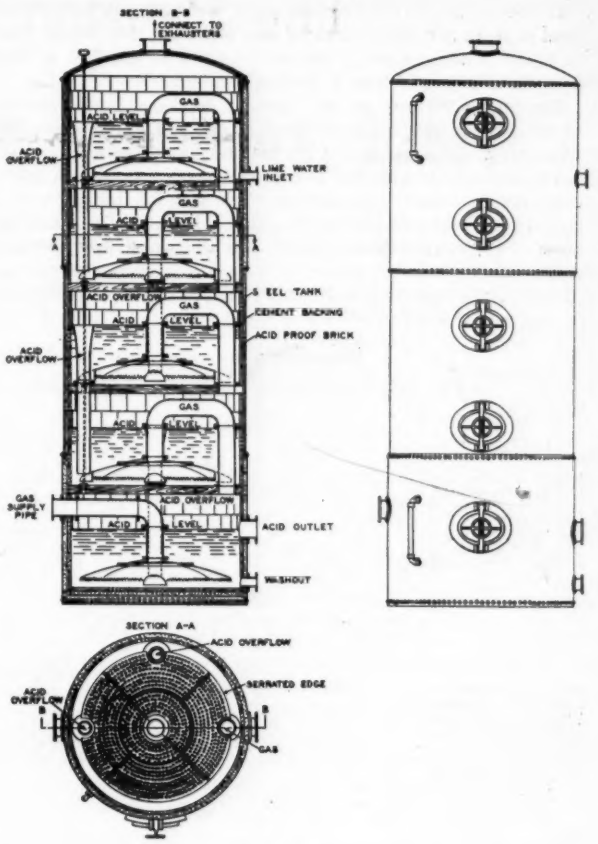

FIG. 2
Paulson acid absorber.

Description of the Paulson Absorber

The Paulson apparatus is an interesting example of the application of the above fundamentals to acid making. It is shown in Fig. 2. It will be seen that it is a modified bubble cap column, with one large cap per plate. The variation of this arrangement from the usual type of bubble cap construction where there are many caps per plate, is necessitated by the fact that the liquid stream carries a suspension of lime and monosulphite. Under such conditions, the usual type of bubble cap apparatus would soon plug with solids. The use of one large cap per plate is a standard construction in an analogous case of gas-liquid reaction involving a suspension of solids,—namely the carbonating tower used in the Solvay ammonia-soda process.

[4] Sutermeister, "Chemistry of Pulp and Paper Making." John Wiley & Sons, 1920, pp. 160-161.
[5] "The Manufacture of Pulp and Paper." McGraw-Hill Book Co., Inc. 2nd Ed. Vol. III, p. 33.
[6] Sutermeister, loc. cit. p. 161.
[7] Sutermeister, loc. cit., p. 161. "The Manufacture of Pulp and Paper," 2nd Ed., Vol. III, pp. 34-35.
[8] Papier-Fabrikant. Nov. 27, 1927, p. 755.

It will be noted that overflow pipes maintain a definite liquor level of about two feet of acid on each plate, and this definite level of liquor is independent of the rate of liquid or gas flow as long as neither is greater than a limiting amount.

The contact between gas and liquid is developed by the passage of the gas through the perforation in the tops of the bells, and from under the serrations on the bottoms of the bells.

The shell of the absorber is constructed of a steel shell, fabricated in accordance with ordinary tank practice, backed with a layer of concrete, and lined with acid proof brick. The plates are made of cypress, 5½ inches thick. The acid overflows, gas pipes, and bubble caps are of bronze in the top four compartments and of lead in the bottom compartment. The bell caps are constructed in sections

Operating Data

The following data obtained from a Paulson tower are of interest:

GAS ANALYSES

Stream	Per cent SO_2	Per cent CO_2	Per cent O_2	Per cent N_2
Gas to absorber	18.0	3.0	2.0	77.0
Gas in compartment 5	16.5	3.1	2.1	78.0
Gas in compartment 4	12.8	3.2	2.2	81.7
Gas in compartment 3	2.0	3.5	2.4	92.0
Gas in compartment 2	1.26	3.6	2.5	92.8
Gas leaving absorber	trace	3.7	2.5	94.9

(The compartments are numbered from top to bottom.)

LIQUOR ANALYSES

Lime water entering absorber:
$Ca(OH)_2$ = 8.44 g. per l.
$Mg(OH)_2$ = 6.18 g. per l.

Stream	Per cent total SO_2	Per cent free SO_2	Per cent combined SO_2
Liquor in compartment 5	3.52	2.11	1.41
Liquor in compartment 4	3.17	1.73	1.44
Liquor in compartment 3	2.19	1.02	1.71
Liquor in compartment 2	0.19	alkaline	none
Liquor in compartment 1	0.19	alkaline	none

Volume of gas entering tower = 1400 cu. ft. per min. at 0 deg. C. and 760 mm. Hg.
Lime water entering tower = 150 gal. per min.
Vacuum on top compartment = 11.25 in. H_2O.
Pressure at gas entrance to tower = 6. in. H_2O.

From the above data the weight of SO_2 absorbed in each column section per minute was calculated. The results are as follows:

Compartment	SO_2 absorbed per min., lb.	Per cent of total absorption in compartment
1	2.6	5.8
2	1.6	3.5
3	26.0	57.8
4	11.0	24.4
5	3.8	8.5

It will be noted that the bulk ofthe absorption takes place in compartments 3 and 4. In these sections the gas is still high in sulphur dioxide, and the back pressure of sulphur dioxide from the solution is very low because the sulphur dioxide is present in the liquor in the combined form. In the bottom compartment (number 5) the weight of sulphur dioxide absorbed is low because of the high partial pressure exerted by the free sulphur dioxide dissolved in the liquor. In the top sections (numbers 1 and 2) the absorption is small because of the low sulphur dioxide content in the gases. It must be emphasized that compartments 1, 2 and 5 are filling very necessary functions in spite of the low absorption in them. Compartments 1 and 2 are removing the last of the sulphur dioxide in the gas from compartment 3, while compartment 5 is building up the concentration of free sulphur dioxide in the liquor leaving the column.

Comparison of Limestone-Tower and Paulson Systems

The most popular acid making process at the present time is the tower calcium carbonate system. This apparatus consists of two tall towers packed with broken limestone rock. The gas and liquid pass through the two towers in series, the two streams passing each other in counter current flow. It is important to compare this system with the Paulson method:

The Paulson method offers the following advantages over the limestone-tower system:

1. The Paulson tower is of the bubble type, and because of the far better contact between liquid and gas, has a much greater volumetric capacity than does the limestone tower. For example, a Paulson tower 27 feet high and 8 feet in diameter has a capacity high enough for a 100 ton sulphite mill, while two towers, approximately 90 feet high and 12 feet in diameter would be required for a limestone system.

2. In spite of the fact that the first cost per unit volume of the Paulson absorber is somewhat higher than that of limestone towers, the volumetric capacity is so much greater that the first cost of a Paulson system is far below that of the corresponding limestone apparatus. The cost of a Paulson acid system for a 100 ton mill is about one third that of a corresponding limestone-tower system. This difference in cost is partly due to the fact that considerable solid handling equipment is necessary in the limestone system.

3. The Paulson system offers a better chance for accurate and flexible control. The strength of acid can be easily controlled, no matter what the rate of gas flow may be, as long as the velocities are not so high as to blow the liquor off the plates. The packing in the limestone tower is continually changing, and tends to result in non-uniform operation. This trouble is absent in the Paulson tower.

4. A packed column is subject to the channelling of the liquor, or to the bridging of the limestone in the tower. These troubles cannot happen in the Paulson tower, and uniformity of operation is easily maintained, even when starting up, since there are no variations in liquor levels, or gas-liquid contact area, and there is no draining of the tower upon shutting down.

5. Dolomitic limes can be readily used in the Paulson tower. Such limestones often cause trouble and reduced capacity in the limestone tower, because the rate of solution of magnesium carbonate is less than that of calcium carbonate, and the latter dissolves while the magnesium compound is carried along with the liquid in the form of a sludge that tends to plug the columns. It has been shown above that dolomitic limes are valuable in the cooking operation, and a system of acid making that is well adapted to use them has a considerable advantage over one that uses dolomites with difficulty.

6. The acid in the Paulson column can be high in free SO_2 even if the water used is warm. Although the Paulson system is ordinarily operated under suction, it can readily be operated under pressure, and the concentration of SO_2 in the liquor can be made as high as is desired. If the water is warm, the pressure on the tower is increased to such a point that the decrease in sulphur dioxide solubility due to temperature increase is counterbalanced by the increased partial pressure of sulphur dioxide in the entering gas. There is a tendency to use stronger and stronger cooking acid, and the Paulson absorber can be used to prepare these strong acids.

7. The amount of solids handled is less than in the limestone system. In the Paulson system, lime, at floor level, is mixed with water and the milk of lime pumped to the top of the tower. In the limestone system the limestone must be lifted mechanically to the tops of the towers.

The limestone-tower system has these advantages over the Paulson system:

1. The limestone system requires less power since natural draft is largely used to move the gases. The difference in power requirements is not great. A 100 ton Paulson system requires about 85 horse power, while a limestone system of the same size requires about 25 horsepower. The cost of this difference in power is approximately 8 cents per ton of pulp, and is a minor item.

2. The Paulson system, as ordinarily operated, used a more expensive raw material (burnt lime) than does the tower system, which uses limestone. On the other hand, crushed limestone has been used successfully in place of milk of lime in the Paulson system, and if the difference in cost between lime and limestone is high, crushed limestone can be used.

Section of the

COST DEPARTMENT

of the

American Paper and Pulp Association

Edited by T. J. Burke C. A. Director Cost Dept.

Stabilization of Industrial Employment

By L. C. Reynolds[1]

Business is a three sided affair and might be represented by a triangle. On one side there is Capital with its profits, on another side there is Labor with its wages, and on the other side is the Consumer calling for service. Obviously the consumer pays out of wages and profits, and chiefly out of wages. Most of our efforts have been put forth to stabilize the profits and consumption sides of the triangle with no thought of the variable third side representing wages. And obviously to stabilize wages would practically fix the other two phases of business. Therefore to stabilize Employment is to stabilize business.

The complexity of modern business makes the task of maintaining equilibrium between the multitudinous factors involved seem beyond human ability. But any large subject, reduced to its elements changes from an apparently complex situation to a relatively simple and understandable subject. Furthermore, this is a long range job and the goal may seem so far away that it will take real courage and vision to even get started. But the need is here and if business don't take a hand to make economic progress more orderly, then political efforts may be made, which may be regretted by all.

What Is Stabilization?

It is well to ask the question—what is Stabilization?—before proceeding with this subject, because the use of the word is today so popular that its true meaning is in danger of being lost. When we speak of persons or objects having stability, we make no mistake in our minds as we think of qualities that are *inherent*. But stabilization is thought of as something external or corrective of inherent defects. Now popular trends of thought circumscribe our minds more than we realize. Our whole approach to the unemployment problem, in previous years, has been corrective measures or ones having mitigating influence, without a study of the inherent defects of our economic system.

Government Construction Programs

Now to consider our past approaches to this subject. Cures for unemployment there have been but not preventatives. The idea of undertaking public works in such times as these goes back to antiquity. They kept the idle hoards of Rome busy on public building work, and this idea persists to this day. The engineering plans for such work take so long that Government Construction usually doesn't get under way until the depression is about over. I understand that right now the government offices are clogged with construction plans and that the trouble is lack of ability to work out plans and let contracts fast enough to get even a part of present appropriations under way this year. If we are all employed, it is obvious that the credit tickets we hold against the sum total of life necessities and luxuries are more evenly or universally distributed; but if we all are set to work building post offices which no one wants, then we have not added one bit to those things that people want. The amount that one's wants are to be satisfied in total is proportionate to the total amount of these that society produces regardless of our rate of pay or length of employment. We might as well pay a man for sweeping our already clean sidewalk as to pay him for constructing an unnecessary building.

Other cures we have tried are employment bureaus to get the jobless a job, immigration restrictions, occupational education and in countries such as England they have tried colonization plans.

Unemployment Insurance

But today unemployment insurance stands out as a modern idea. However, it originated in Ghent, Belgium in 1901 and spread to England where after the war it was thought that the accumulated sum of $97,000,000.00 was enormous. But it was soon exhausted and up to last October there had been added to this fund by the Government and employees a total of two and one half billion dollars and still growing more urgent in its demands. There are seventeen countries today having some form of unemployment insurance. Unemployment Insurance is the basis of the General Electric and the Rochester plans but they are limited to the total amount paid in and when the fund is exhausted, may fail when most needed.

Unemployment Insurance has produced the idea of Unemployment Reserves. Insurance is really not such unless it guarantees the Insured. The so called insurance funds mentioned do not guarantee beyond the amount accumulated. They are nothing but relief funds. And Insurance Companies do not take on unemployment insurance because there will never be any acturial data for a basis. Furthermore, an Insurance Company cannot insure a risk which will take place to all policy holders at once. Accordingly, the plans today are developing into programs for unemployment reserve funds.

Then in this country we have the private company plans for guaranteeing a minimum amount of work in a given period such as the Proctor and Gamble Company's plan. Obviously, such plans require absolute control over the consumer sales as the Proctor & Gamble Company soon

* Address delivered at the Inter State Meeting of Paper Mill Representatives at Kalamazoo, Michigan, May 22, 1931.

[1] Comptroller and Assistant to President American Writing Paper Co., Inc., Holyoke, Mass.

found out and were able to bring to pass. However, all companies do not have a sales outlet amendable to such a solution.

During the past three decades there has been some effort at spreading the employment during depression but in isolated cases and only by those employers having a sense of such responsibilities. There is no doubt but that reducing the force is the most ancient and also the easiest and surest method of reducing expenses, and Companies hard pressed financially may find it necessary for immediate needs; but over a long period its savings are questionable due to lower morale and disorganization. Some Industries naturally lend themselves to staggering the help or else working full force part time but most industries do not make this possible without real scientific control of operations. It means Budgetary Control as developed in the past decade.

Trade Budgets

At the recent Atlantic City Meeting of the Chamber of Commerce of the United States I gave a talk on "Business Budgeting to Secure Employment Stability". It will be necessary for me to here outline the important points made in that address. Now Budgeting is not old fashioned industrial planning without research or forecasting work. A Budget may be simply a financial matter but real Budgetary Control is forecasting and planning with subsequent operating control. Forecasting is based on research and must have very close consideration and continual watch over several phases of business that are potent forces in disturbing any forecast. I refer to such things as (1) Increasing efficiencies of operation, (2) Changes in style, (3) New inventions, (4) New competition with an industry, and (5) Competition with substitutions from other industries. These things all operate to increase our production capacities beyond our needs. It is true that they work for economic progress but we don't want such progress in the "Jungle Fashion". Our progress can be controlled so as to be more orderly and regular. Budgetary Control is the balancing of production with consumption and if this is done by trade groups and correlated nationally, extending such control over expansion and the release of new technical advances, and determining and limiting the hours per week that any one can work so as to completely spread the available work, then we have added something to our economic structure which will permeate it thoroughly and come near to creating inherent stability. The determination of the work week for the man (not for the Industry or Company) is the important thing just as some of the building trades have already done through their unions.

National Control

And this control must be national or of no effect. We already have these controls (except for the determination of the work week) in our most advanced corporations but they are powerless in preventing these major depressions and can not reduce the man's work week in the face of competitors who won't do likewise. But "National Control" should not be governmental interference in business as such. If it is true that theoretically national control ought to be brought about through trade organizations, such would be practical if trade organizations should be clothed with legal authority and all business enterprises compelled to either belong to their respective associations or to abide by their decisions mutually arrived at. It is true that if each industry should adopt a real Budgetary Control based upon a real forecast, we would automatically have national budgetary control as the sum total of the units would be the national whole. It would seem that by some such methods trade organizations could be made quasi governmental; otherwise the government itself should undertake this work which simply described, would be estimating our total consumptions, coverting same into total man days, dividing this by the total number of workers in the country, and dividing this by 50 weeks (allowing two weeks for vacation) in order to arrive at the number of days per week which men will work in each industry. Such a plan ought to allow us to operate yearly with of course the necessary fluctuations which our balance of trade between exports and imports might bring about. There has been considerable discussion regarding a central body for national planning of business. It may not be possible to do such a vast work within one central body nor be safe if possible. But this work done by the trade groups themselves, properly authorized by law and subject to a national check, would promote the idea of self government rather than further repressions.

Causes of Unemployment

We can roughly classify the causes of unemployment as (1) Seasonal, (2) Technological, (3) Political, and (4) Cyclical. The seasonal demands have been ironed out largely in well managed corporations by means of inventory control and expansion of same in the dull season. And some companies are also doing the same thing in their buying so as to pass the advantage on to the vendor.

Technological causes have been operating for a century although the idea seems recent. It is because we have changed from an agricultural to an Industrial nation with the turn of the century and this together with the "Tempo" of action has accentuated the effect of Technological advances, causing serious displacement of labor and also of capital. Certain large corporations have exercised some measure of control over release of major technical advances, but of course only as they might have affected themselves adversely. Displaced labor must shift to other occupations and provision has never been made for the necessary education for such changes where whole trades have been almost rendered useless.

But the political and cyclical causes are the real factors to cope with and will always give trouble as here is involved the relatively uncontrollable human mind. Some of our political causes such as tariffs and monetary troubles and cyclical causes such as wet and dry seasons can be subjected to some measure of control. But revolutions or speculative hysteria can only be prevented by education of the masses.

But let us note right here, that Trade Budgets would automatically reduce the working hours on the arrival of such depressions, still spreading the work between all men. Thus the pyramiding of curtailed consumption due to men thrown completely out of work, would be no more. Then too, the fear of losing one's job would also be removed. It is that fear that curtails consumption by those able to buy and it is that fear right now that holds back buying and continues the depression. In other words, under Trade Budget plans there would be universal part time work of the whole force in each industry and depressions would lose their severity and their suffering and would pass by as simply low points in our production curves. Unemployment reserve funds would then not be necessary; but let us remember that any plan of Budgetary control in even one corporation takes several years for perfection and that each year we build on a more sure foundation, and that therefore we would need unemployment reserves in the meantime.

Every depression is the reaction from a period of wild optimism and is precipitated and aggravated by any of the other causes. The Trade Budget control will go far towards checking speculation and removing the excuse for political convulsions. It would also lessen the shock of the minor causes, even correcting some of them.

It was with considerable temerity that I ventured the idea of trade budgets, but I found a great many with similar ideas, wanting either a national planning board or planning by groups or something similar. So the more liberal element has received the idea but the more conservative element has kept a reservation, while seeing merit in it for an ultimate goal. Their idea is to build "from the bottom up" while the Trade Budget is building "from the top down". An Atlantic City speaker stated that in his opinion the next depression would find this subject still in the discussion stage, as working "from the bottom up" meant a gradual experimentation by individual companies and scattered adoption of unrelated plans impossible of coordination. It is true that in starting Budgetary control in a corporation, we first start at the top as we must determine our policies and sales outlet. Then we build up budgets from the bottom up. But we know that if we don't first make up the outline from the top down, we will never have anything of value. Anyway, we know that there is no control nor real budgets if we only have budgets for scattered departments. It is the same in our national business structure. Furthermore, we cannot wait for a gradual working out of this plan by private individual operations. However, there is encouragement in the resolution passed by the National Chamber in Atlantic City, calling for "continued study by a special committee, of business and employment Stabilization."

There has been no serious adverse criticism from the Press in General but there has been some letters written remonstrating for opposite reasons. The writer of one letter says that the idea "supports the Socialist-Communist-Collectivist thesis" and that he is in favor of "the good old American System of individualism"; while another says that the idea is one for enabling the employer to still more dominate affairs and that the controlling "would be done in the interests of the few and not the many."

It is well to remember that Trade Budgeting by Trade groups to control their own working hours, expansions and technological applications, is *cooperative individualism* and so are all of our trade association activities. With the disappearance of our frontier life and the advance in world transportation and communication, we cannot have pure individualism and must have cooperative effort without stifling individual initiative.

One financial Journal devoted over a column of editorial space in opposition to this plan and stated that the idea grew out of "imitative minds influenced by hearing about the planned activities of a communistic government", and "belief in the powers of divination", and that it would mean the "control of profit", "extortion", and a "despotism managed by industrialists". The next day the president of one of our largest nationally known corporations made a similar suggestion of Trade group planning at the Washington meeting and the same Journal devoted the same space to an attack of his plan. Of course we know that this idea has grown out of Budgetary Control of business and not out of communistic government; that corporations have exercised divination powers for a decade in forcasting and research work; that this control has no remote connection to extortionate profits; and that self government with central appeal is basic in our ideas.

Having mentioned all the unfavorable comments, I will now turn to the newspapers where it has been received with variations of approval. One section of the press only saw in the plan the idea of compulsory employment reserves.

Another section of the press takes the Atlantic City meeting to task for not taking more definite action, listing the various ideas advanced at the meetings and strangely listing "planning by trade groups" as being another idea than "Trade Budgeting." Budgeting doesn't seem to be entirely understood.

Another section of the press devoted considerable space to the idea of Trade Budgets but doesn't see how it can be brought about without governmental interference. But here I might remark that this idea is to substitute positive for present negative laws. In place of the "Don't" we would have the "Do" and cooperation. The only case for governmental interference would be in coordination between trades and in reviewing appeals or abuses. We already have that much interference and more.

Some sections of the press such as the New York Times seem to understand the whole idea and covered the subject well while others were inaccurate although favorable to what they reported.

Another section of the press devoted editorials to the subject of Trade Associations extending their work to cover the field of Budgetary Control, and quoting President Hoover as saying: "Every development of industry renders trade associations more essential to sound development of our economic system."

Practically every paper in the Country has covered this subject and favorably by an overwhelming majority but with reservations or without commitments by the balance; and I feel that I must quote a portion of one editorial from a New York paper. "The leaders of American Industry, whether they realize it or not, have become the trustees of American well-being. Unelected, they represent the people who, dislodged from the soil and herded in cities and industrial centres, are important to help themselves. Most industrial leaders gain more satisfaction in sense of achievement than in amassing wealth. America's present plight presents an unprecedented opportunity to American leaders to join in an entirely new type of planning, planning that would help restore industrial and commercial equilibrium. Here is offered a new type of leadership, a new type of achievement, a new type of mercy, a new type of patriotism and a new type of self-help."

I have no ear for those individuals who publicly state that our present system is one which has come to us like the natural forces and that if we will wait, this depression will pass like all others, and that these depressions are the best stabilizers known, in that they correct our periods of inflation. They remind me of those of a by gone generation who were afraid to interfere with sickness and disease as being divinely appointed.

I will close by reading the summary from the address I made in Atlantic City.

First: We need better control of distribution by the producer in order that—

Second: We may have complete budgetary control by (a) industrial units, (b) trade groups, and (c) nationally in some form, to the end that—

Third: We arrive at a resultant work week for labor of not more days than will keep everyone busy, all of which requires that—

Fourth: We should have some group or national budgetary control over expansion, and—

Fifth: Some form of occupational education of labor to be displaced by technological changes, and—

Sixth: Some control over the release of new inventions, and—

Seventh: Lacking full attainment of the above ideals in our realist world, we need compulsory reserves in trust so as to guarantee returns to labor in the same manner as surplus accounts are now built up to guarantee return to capital, but—

Eighth: Above all we need to educate the human mind against over optimism and the resulting speculation in life's necessities and likewise against over pessimism and the resulting fears of the jungle; in other words, we need that which has made for all progress of man kind; we need more FAITH.

COST SECTION

IMPORTS OF PAPER AND PAPER STOCK

NEW YORK, BOSTON, PHILADELPHIA AND OTHER PORTS

NEW YORK IMPORTS

WEEK ENDING JUNE 20, 1931
SUMMARY

Cigarette paper	29 cs.
Wall paper	6 bls., 8 cs.
Paper hangings	5 bls., 2 cs.
News print	14,541 rolls
Printing Paper	82 cs.
Wrapping paper	6 bls., 53 cs.
Packing paper	5 cs.
Decalcomania paper	31 cs.
Drawing paper	1 cs.
Filter paper	1 ble., 28 cs.
Metal coated paper	146 cs.
Surface coated paper	67 cs.
Colored paper	7 cs.
Tracing paper	10 cs.
Writing paper	13 cs.
Envelopes	5 cs.
Bristol boards	4 cs.
Sulphite paper	12 rolls
Velvet paper	2 cs.
Paper spools	55 cs.
Paste board	96 cs.
Card board boxes	3 cs.
Miscellaneous paper	59 rolls, 133 cs.

CIGARETTE PAPER

Brown & Williamson Tobacco Co., Majestic, Southampton, 10 cs.
Madison Bank & Trust Co., Majestic, Southampton, 19 cs.

WALL PAPER

W. H. S. Lloyd & Co., Amer. Banker, London, 4 bls.
R. F. Downing & Co., Majestic, Southampton, 3 cs.
Thomas & Pierson, Berengaria, Southampton, 1 cs.
Phoenix Shipping Co., Deutschland, Hamburg, 4 cs.
R. F. Downing & Co., Deutschland, Hamburg, 2 bls.

PAPER HANGINGS

W. H. S. Lloyd & Co., France, Havre, 1 cs.
J. E. Bernard & Co., France, Havre, 5 bls.
Whiting & Patterson Co. Inc., Majestic, Southampton, 1 cs.

NEWS PRINT

W. H. Bell, Markland, Liverpool, N. S., 3,789 rolls.
Stora Kopperberg Corp., Drottningholm, Gothenburg, 48 rolls.
Perkins, Goodwin & Co., Dresden, Bremen, 411 rolls.
Jay Madden Corp., Dresden, Bremen, 295 rolls.
Bank of Montreal, Cornerbrook, Cornerbrook, 9,392 rolls.
——, Cleveland, Hamburg, 33 rolls.
Perkins, Goodwin & Co., Deutschland, Hamburg, 222 rolls.
——, Deutschland, Hamburg, 259 rolls.
Jay Madden Corp., Pr. Roosevelt, Hamburg, 92 rolls.

PRINTING PAPER

Japan Paper Co., L. A. Christensen, Marseilles, 17 cs.
Japan Paper Co., Caronia, London, 3 cs.
Burroughs, Wellcome & Co., Caronia, London, 10 cs.
——, Dresden, Bremen, 20 cs.
D. C. Andrews & Co., Dresden, Bremen, 3 cs.
E. Dietzgen & Co., Statendam, Rotterdam, 29 cs.

WRAPPING PAPER

E. Dietzgen & Co., Statendam, Rotterdam, 53 cs.
H. J. Heinz Co., Cleveland, Hamburg, 6 bls.

PACKING PAPER

International F'd'g Co., Resolute, Hamburg, 5 cs.

DECALCOMANIA PAPER

B. F. Drakenfeld & Co., Baltic, Liverpool, 1 cs. (duplex); 11 cs. (simplex).
C. W. Sellers, Europe, Bremen, 19 cs.

DRAWING PAPER

Keuffel & Esser Co., Caronia, London, 1 cs.

FILTER PAPER

H. Reeve, Angel & Co. Inc., Caronia, London, 3 cs.
H. Reeve, Angel & Co., Inc., Berengaria, Southampton, 6 cs.
A. Giese & Son, Majestic, Southampton, 9 cs.
C. Schleicher & Schull Co. Inc., Resolute, Hamburg, 10 cs, 1 ble.

METAL COATED PAPER

Globe Shipping Co., Dresden, Bremen, 135 cs.
F. C. Gerlach, Deutschland, Hamburg, 1 cs.
K. Pauli Corp., Deutschland, Hamburg, 7 cs.
Taub, Hubbel & Schnall, Deutschland, Hamburg, 3 cs.

SURFACE COATED PAPER

Gevaert Co. of America, Pennland, Antwerp, 65 cs.
Titan Shipping Co., Resolute, Hamburg, 2 cs.

COLORED PAPER

S. Gilbert, Dresden, Bremen, 1 cs.
W. Bersch, Cleveland, Hamburg, 6 cs.

TRACING PAPER

Phoenix Shipping Co., Dresden, Bremen, 9 cs.
Phoenix Shipping Co., Resolute, Hamburg, 1 cs.

WRITING PAPER

A. Flinn & Co., France, Havre, 1 cs.
Japan Paper Co., France, Havre, 9 cs.
B. Altman & Co., Majestic, Southampton, 1 cs.
International F'd'g Co., Berengaria, Southampton, 1 cs.
Globe Shipping Co., Berengaria, Southampton, 1 cs.

ENVELOPES

Vevaert Co. of America, Pennland, Antwerp, 2 cs.
——, Dresden, Bremen, 3 cs.

BRISTOL BOARDS

Keuffel & Esser Co., Caronia, London, 4 cs.

SULPHITE PAPER

E. J. Calvin, Drottningholm, Gothenburg, 12 rolls.

VELVET PAPER

W. H. Schweikers, Pennland, Antwerp, 2 cs.

PAPER SPOOLS

——, Dresden, Bremen, 55 cs.

PASTE BOARD

H. Heide, Inc., Dresden, Bremen, 18 cs.
——, Resolute, Hamburg, 78 cs.

CARD BOARD BOXES

Freeman & Slater, Resolute, Hamburg, 3 cs.

MISCELLANEOUS PAPER

Public National Bank, Hinnoy, Marseilles, 5 cs.
Van Oppen & Co., Roma, Genoa, 25 cs.
——, Roma, Genoa, 16 cs.
The Borregaard Co. Inc., Drottningholm, Gothenburg, 59 rolls.
E. H. Sargent & Co., Drottningholm, Gothenburg, 14 cs.
R. Wilson Paper Corp., Caledonia, Glasgow, 9 cs.
Keuffel & Esser Co., Statendam, Rotterdam, 10 cs.
Borden, Riley Paper Co., Statendam, Rotterdam, 45 cs.
Brown & Williamson Tobacco Co., France Havre, 6 cs.
Davies, Turner & Co., Deutschland, Hamburg, 3 cs.

RAGS, BAGGINGS, ETC.

Chemical Bank & Trust Co., Dresden, Bremen, 38 bls. manila nets.
T. D. Downing & Co., Caledonia, Glasgow, 100 bls. bagging.
International Trust Co., Statendam, Rotterdam, 21 bls. rags.
——, Saco, Antwerp, 78 bls. flax waste.
Banco Coml. Italiana Trust Co., Hinnoy, Savona, 227 bls. bagging.
1st National Bank of Boston, Hinnoy, Savona, 221 bls. bagging.
——, L. A. Christensen, Barcelona, 157 bls. bagging.
E. J. Keller Co., Inc., Liberty, ——, 140 bls. bagging.

OLD ROPE

Tupman, Thurlow & Co., Minnetonka, London, 44 coils.
Banco Coml. Italiana Trust Co., Resolute, Hamburg, 33 coils.
International Trust Co., L. A. Christensen, Barcelona, 39 coils.
——, Vulcania, Trieste, 58 rolls.
E. J. Keller Co. Inc., Exilona, ——, 155 coils.

WOOD PULP

E. M. Sergeant & Co., United States, Oslo, 150 bls. chemical pulp, 25 tons.
Perkins, Goodwin & Co., Drottningholm, Gothenburg, 103 bls. sulphate; 371 bls. sulphite.
E. M. Sergeant & Co., Drottningholm, Gothenburg, 449 bls. kraft soda pulp.
Russell McCandless, Drottningholm, Stockholm, 800 bls. unbleached sulphite, 125 tons.
Irving Trust Co., Dresden, Bremen, 500 bls. wood pulp.
——, Dagali, Chandler, P. Q., 8,276 bls. wood pulp.
Castle & Overton, Inc., Statendam, Rotterdam, 457 bls. wood pulp.
Lagerloef Trading Co., Schenectady, Helsingfors, 1,095 bls. sulphite, 182 tons.
Lagerloef Trading Co., Sagoporack, Wiborg, 300 bls. sulphate, 50 tons.
Irving Trust Co., Sagoporack, Wiborg, 300 bls. sulphite, 50 tons.
——, Sagoporack, Kotka, 2,380 bls. sulphate, 397 tons.
——, Sagoporack, Kotka, 1,005 bls. sulphite, 169 tons.
Lagerloef Trading Co., Sagoporack, Hango, 545 bls. sulphite, 82 tons.
M. Gottesman & Co., Inc., Alberta, Sebenico, 2,400 bls. wood pulp.

WOOD PULP BOARD

Lagerloef Trading Co., Schenectady, Helsingfors, 190 bls.

WOOD FLOUR

Innes, Speiden & Co., Drottningholm, Gothenburg, 363 bags.

BOSTON IMPORTS

WEEK ENDING JUNE 20, 1931

G. F. Malcolm, Baltic, Liverpool, 29 cs. tissue paper.
Oxford University Press, Baltic, Liverpool, 5 cs. paper.
F. J. Fawcett, Saco, Antwerp, 267 bls. flax waste.
Brown Bros., Harriman & Co., Saco, Antwerp, 67 coils old rope.
2nd. National Bank of Boston, Saco, Antwerp, 25 bls. thread waste.
Irving Trust Co., Schenectady, Helsingfors, 150 bls. mechanical pulp, 25 tons.
Atterbury Bros. Inc., Schenectady, Helsingfors, 150 bls. wood pulp, 25 tons.
Lagerloef Trading Co., Schenectady, Helsingfors, 145 bls. sulphite, 24 tons.
Lagerloef Trading Co., Schenectady, Wiborg, 1,500 bls. sulphate, 250 tons; 1,350 bls. sulphite, 225 tons.
——, Schenectady, Kotka, 1,874 bls. sulphate, 347 tons;
——, Schenectady, Kotka, 710 bls. sulphite, 136 tons.
Price & Pierce, Ltd., Schenectady, Orviken, 2,400 bls. wood pulp, 406 tons.
M. Gottesman & Co., Inc., Alberta, Sebenico, 1,600 bls. wood pulp.

(Continued on Page 56)

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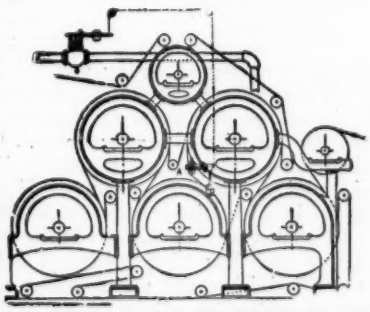

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Imports of Paper and Paper Stock

(*Continued from page 54*)

Waterfalls Papermills, Alberta, Trieste, 250 bls. wood pulp.
E. J. Keller Co. Inc., Pipestone County, ——, 52 bls. bagging.

PHILADELPHIA IMPORTS

WEEK ENDING JUNE 20, 1931

——, N. Maersk, Kobe, 294 bls. rags.
F. Weber & Co., Saco, Antwerp, 39 cs. paper.
E. Butterworth & Co. Inc., Saco, Antwerp, 47 bls. bagging.
Castle & Overton, Inc., Saco, Antwerp, 162 bls. rags.
Katzenstein & Keene, Inc., Saco, Antwerp, 391 bls. rags.
Price & Pierce, Ltd., Schenectady, Orviken, 5,700 bls. wood pulp, 965 tons.
Pagel, Horton & Co. Inc., Schenectady, Hornefors, 1,800 bls. sulphite, 300 tons.
Parsons & Whittemore, Inc., Sagoporack, Helsingfors, 300 bls. wood pulp, 50 tons.
Neidich Process Co., Sagoporack, Helsingfors, 27 cs. tissue paper.
Lagerloef Trading Co., Sagoporack, Wiborg, 8,618 bls. sulphite, 1,508 tons.
Lagerloef Trading Co., Sagoporack, Kotka, 3,369 bls. sulphite, 663 tons.
Lagerloef Trading Co., Sagoporack, Hango, 310 bls. sulphite, 52 tons.
Robert Blank, L. A. Christensen, Valencia, 97 bls. rags.
E. J. Keller Co., Inc., L. A. Christensen, ——, 73 bls. rags.
Marine Midland Trust Co., L. A. Christensen, Barcelona, 40 bls. rags.
J. Andersen & Co., Alberta, Trieste, 1,300 bls. wood pulp.
Congoleum Nairn Co., Alberta, Venice, 349 bls. rags.
E. J. Keller Co., Inc., Exmouth, ——, 98 bls. rags.
E. J. Keller Co., Inc., West Harcuvar, ——, 43 bls. rags.

PORTLAND IMPORTS

WEEK ENDING JUNE 20, 1931

Lagferloef Trading Co., Schenectady, Helsingfors, 1,947 bls. sulphite, 325 tons.
Lagerloef Trading Co., Schenectady, Wiborg, 2,153 bls. sulphite, 360 tons; 1,360 bls. sulphate, 227 tons; 318 bls. mechanical, 52 tons.
Lagerloef Trading Co., Schenectady, Kotka, 669 bls. sulphite, 113 tons.
——, Schenectady, Kotka, 1,737 bls. sulphite, 294 tons.
Pagel, Horton & Co., Inc., Schenectady, Hornefors, 1,500 bls. sulphite, 250 tons.

NORFOLK IMPORTS

WEEK ENDING JUNE 20, 1931

Lagerloef Trading Co., Sagoporack, Wiborg, 1,243 bls. sulphate, 207 tons.
Irving Trust Co., Sagoporack, Wiborg, 300 bls. sulphate, 50 tons.
Lagerloef Trading Co., Sagoporack, Kotka, 2,415 bls. sulphite, 426 tons.
Lagerloef Trading Co., Sagoporack, Hango, 4,531 bls. sulphite, 769 tons.

SAVANNAH IMPORTS

WEEK ENDING JUNE 20, 1931

Darmstadt, Scott & Courtney, N. Maersk, Shanghai, 100 bls. bagging.

NEWPORT NEWS IMPORTS

WEEK ENDING JUNE 20, 1931

Price & Pierce, Ltd., Sagoporack, Stockholm, 5,8T80 bls. sulphite, 746 tons.

News Print Production for May

Production of news print paper in Canada during May 1931 amounted to 202,607 tons and shipments to 202,280 tons, according to the News Print Service Bureau. Production in the United States was 101,202 tons and shipments 102,555 tons, making a total United States and Canadian news print production of 303,809 tons and shipments of 304,835 tons. During May, 24,396 tons of news print were made in Newfoundland and 1,236 tons in Mexico, so that the total North American production for the month amounted to 329,441 tons.

The Canadian mills produced 128,123 tons less in the first five months of 1931 than in the first five months of 1930, which was a decrease of 12 per cent. The output in the United States was 83,490 tons or 14 per cent. less than for the first five months of 1930. Production in Newfoundland was 3,453 tons or 3 per cent. more in the first five months of 1931 than in 1930 and in Mexico 1,229 tons less, making a continental decrease of 209,389 tons or 12 per cent.

During May the Canadian mills operated at 63.0 per cent. of rated capacity, United States mills at 68.8 per cent., Newfoundland mills at 96.3 per cent. and Mexican mills at 67.0 per cent., making a continental average of 66.4 per cent. Stocks of news print paper at Canadian mills totalled 39,962 tons at the end of May and at United States mills 32,956 tons, making a combined total of 72,918 tons which was equivalent to 4.0 days' average production.

The Idaho Forester

The 1931 Idaho Forester, a 64 page booklet published annually by the School of Forestry of the University of Idaho at Moscow, has just been received from the printers according to word from the editorial staff. This year's edition is Volume Thirteen and is dedicated to Mr. Charles K. McHarg, Jr., Regional Forest Inspector, Region One, with headquarters at Coeur d'Alene, Idaho. Mr. McHarg is the contributor of the article entitled "Where Do We Go from Here," contained in the publication, and in it he discusses the Idaho forestry laws, both past and present, and believes Idaho foresters have real problems to solve in our state.

Other contributors of national prominence and their articles are: Major Evan W. Kelley, Regional Forester, Region One, "Natural and Human Forces in Fire Control"; C. L. Forsling, Director, Intermountain Forest and Range Experiment Station, Ogden, Utah, "Range Management as a Field in Forestry"; W. S. Rosenberry, General Manager, Winton Lumber Company, Coeur d'Alene, Idaho, "Industrial Forestry"; S. B. Detwiler, in charge of Office of Blister Rust Control, Bureau of Plant Industry, U.S.D.A., Washington, D. C., "White Pine Production and Blister Rust Control"; Dr. Edwin C. Jahn, Associate Professor of Forestry of the Idaho School of Forestry, "Problems in Wood Chemistry"; and W. H. Bolles, Assistant Forester, Pacific Northwest Forest Experiment Station, Portland, Oregon, "The Forest Survey."

The issue also contains considerable information concerning student activities of the past school year. Twenty seniors received the degree Bachelor of Science in forestry and three graduate students completed the requirements for the degree Master of Science in forestry and were awarded the degrees during commencement this month.

Appellate Division Upholds Appointments

[FROM OUR REGULAR CORRESPONDENT]

ALBANY, N. Y., June 22, 1931.—The appellate division of the Supreme Court has upheld the appointment of the three commissioners of appraisal recently named to hear the case of the Northern New York industrial concerns against the City of New York for alleged diversion of water from the Mohawk River watershed. The Mohawk Paper Makers, operating plants in Cohoes and Waterford, with the Asbestos Spinning and Weaving Company and Little Falls Fibre Company are the plaintiffs and had protested the selection of two of the commissioners on the basis that they had served in a similar capacity in a recent case. It was contended that these two commissioners, Claude B. Mayman, of Schoharie, and Andrew Sheridan, of New York might be prejudiced in a decision on the water diversion controversy. It is alleged that the diversion by New York City of part of the flow of Schoharie Creek and the Gilboa reservoir diminishes the water power at Waterford and affects the operation of the paper mills and other industrial plants.

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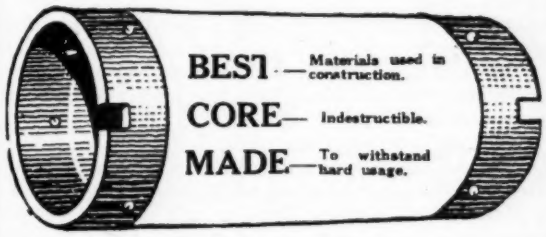

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Sixth and Chestnut Sts., Philadelphia, Pa.

New York Market Review

Office of the PAPER TRADE JOURNAL,
Wednesday, June 24, 1931.

Trading in the local paper market was only moderately active during the past week. Inquiries for the various standard grades of paper for future needs, however, are fairly numerous, and the outlook is considered promising, in some quarters. Sales forces of the local paper organizations are still working hard to book new orders before the mid-summer lull sets in. Prices are generally holding to formerly quoted levels.

Production of news print paper is being maintained at approximately 62 per cent or rated capacity in the United States and Canada, according to information gathered by the News Print Service Bureau. Shipments are going forward at about 62 per cent of rating. The price situation continues unsatisfactory, despite efforts being made to stabilize conditions.

The position of the paper board market is practically unchanged. Offerings of box board are sufficient to take care of current requirements. No radical price changes have been reported. The fine paper market is fairly steady and supplies of writing and book papers are moving in satisfactory volume. The coarse paper market is exhibiting a stronger undertone and kraft wrapping paper is going forward at a seasonal pace.

Mechanical Pulp

Steadiness prevails in the ground wood market and although demand for both foreign and domestic mechanical pulp is light at the present time, accumulations are not excessive. The contract movement is about normal considering the prevailing business depression. Prices are holding to the recently revised schedule, without difficulty.

Chemical Pulp

With stocks at the docks somewhat depleted, and stocks at the mills lower than at this time last year, the chemical pulp market is in a fairly satisfactory statistical position. Another encouraging factor is the continued curtailment of production, both here and abroad. Domestic and imported kraft pulp are firmer and other grades remain unchanged.

Old Rope and Bagging

The old rope market continues quiet. Demand for foreign and domestic old manila rope is restricted. Small mixed rope is dull. Prices remain unaltered. The bagging market is fairly steady. Scrap and gunny bagging are in good request, while roofing bagging is going forward in fairly heavy volume. Prices are holding to schedule.

Rags

Conditions in the domestic rag market show little signs of improvement. Cotton cuttings are not arousing much interest at present. Mixed rags are moving slowly. Demand for roofing rags has slackened, but offerings are limited. The imported rag market is more or less neglected, although the roofing grades are moving more freely.

Waste Paper

Some improvement was noticed in the demand for the lower grades of paper stock. Board mills, in particular, are displaying more interest in No. 1 mixed paper. Old kraft machine compressed bales are in better request. The better grades of waste paper rule fairly steady, especially hard and soft white shavings. Prices are generally unaltered.

Twine

Demand for twine is holding up very well and the volume of business being transacted is about equal to that of the preceding year at this time. Supplies are moving into consumption in good volume for the season. Prices are being maintained at formerly quoted levels, despite keen competition.

Tuscaloosa Mill Expanded

TUSCALOOSA, Ala., June 22, 1931.—The new unit for the manufacture of paper brought to the Tuscaloosa plant of Gulf States Paper Mill has been installed and in operation with the exception of electrical equipment.

The plant of the company at Braithwaite, La., was consolidated with the plant here and will increase the volume of paper manufactured.

Installation of the machinery brought to Tuscaloosa from the Braithwaite plant has been going on several months and additional buildings were constructed but most of the machinery was placed in the plant that had already been built and planned for enlargement.

To Remove Executive Offices to East Walpole

A brief item in the issue of the PAPER TRADE JOURNAL of June 4, announcing the removal of the executive offices of the Hollingsworth & Vose Company was slightly inaccurate. The company writes regarding this as follows:

"We should like to have this corrected, as the proper address will be The Hollingsworth & Vose Company, East Walpole, Mass. and not Walpole. We are desirous of having this correct, as there is quite a distance between the two Post Offices. We shall maintain a branch office at 333 Washington street, Boston, but all communications after August 1, should be sent to East Walpole, Mass."

Make Rayon Pulp for Cornwall Firm

Following successful preliminary manufacture of rayon pulp, Fraser Companies are doing research work in connection with production on a commercial scale. The Athol mill of the company's subsidiary, the Restigouche Company, is the center of operations. Rayon pulp will be shipped it is understood, to Courtaulds Ltd., the big Cornwall, Ont., firm. The Athol mill is operating six days a week.

FARREL-BIRMINGHAM
COMPANY INC.

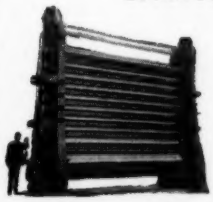
50 STATE ST., ANSONIA, CONN.

CALENDERS: Board
CALENDERS: Paper
CALIPERS: Roll
GRINDING MACHINES: Roll
PRESSES: Hydraulic
Calender Roll Recovering
Pulp Dehydrating

ROLLS: Chilled Iron, Dry Sand, Gray Iron, Alloy Iron, Steel
For: Calender Stacks
Board Calenders
Super-Calenders
Glassine Calenders
Friction Rolls
Breaker Rolls
Smoothing Rolls
Creping Rolls
Plater Rolls
Cutting Machines
Paraffining and Waxing Machines
Saturating Machines
Silicating Machines
Miscellaneous Special Purposes

TRANSMISSION MACHINERY:
Gears, Cut: Spur, Single and Double Helical (Farrel-Sykes Continuous Tooth Type)
Speed Reduction Units (Farrel-Sykes)

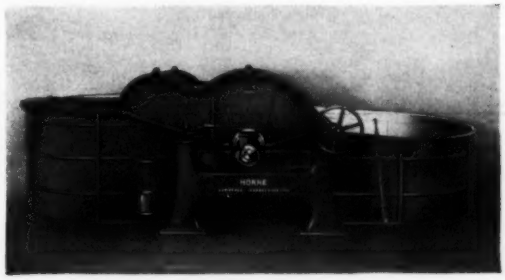
See PAPER AND PULP MILL CATALOG
LOCKWOOD'S DIRECTORY—1931



Farrel Chilled Iron Rolls combine maximum strength with notable hardness, flawlessness of surface and extreme accuracy. Paper Finishing Calender Stacks in all sizes up to 298" face, equipped with electric, hydraulic or ratchet lift, all operated from the floor. Other uses listed above.

NEW RECORDS FOR PRODUCTION AND PRECISION ARE MADE ON FARREL-BIRMINGHAM MACHINES

HORNE
HIGH SPEED BEATER



Horne Iron Tub High Speed Beater. High density. Fast circulation. Self dumping. Low h. p. per ton. Forged steel spindle. Machine finished slots in roll. Self aligning water jacketed bearings. Adjustable doctor. Hand operated dump valve. One-piece lighters. Iron or wood tub.

J. H. HORNE & SONS CO.
Established 1864
LAWRENCE, MASS., U. S. A.

Fourdrinier Paper Machines—Cylinder Paper & Board Machines—Beating Engines—Washing Engines—Jordan Engines—Pope Conservators—Wet Machines—Paper & Board Cutters—Beater Bars, Beater Plates and Jordan Fillings of steel, bronze, stainless iron and steel—Enclosed Unit Spiral Drives.

TO THE PAPER MILL SUPERINTENDENT

It is sound economy to generalize in G D C Colors.

Consult our representative—he can offer suggestions.

There is a G D C color for every specialized need.

Current colors are carried in stock at all our offices.

GDC

GENERAL DYESTUFF CORPORATION

230 Fifth Ave.
New York,
N. Y.

Miscellaneous Markets

Office of the PAPER TRADE JOURNAL,
Wednesday, June 24, 1931.

BLANC FIXE—Trading in the blanc fixe market is moderately active. The contract movement is fairly heavy. The pulp is quoted at from $42.50 to $45 per ton; while the powder is selling at from 3¾ cents to 4½ cents per pound, in barrels, at works.

BLEACHING POWDER—The bleaching powder market is displaying a steady tone. Shipments against contract are moving in good volume. Prices are holding to schedule. Bleaching powder is quioted at from $2 to $2.35 per 100 pounds, in drums, at works.

CASEIN—The casein market is easier. Domestic standard ground is now quoted at 6¾ cents and finely ground at 8½ cents per pound. Argentine standard ground is selling at 8½ cents and finely ground at 9½ cents per pound, all in bags, car lot quantities.

CAUSTIC SODA—Demand for caustic soda is light at present. Prices are steady and unaltered. Solid caustic soda is quoted at from $2.50 to $2.55; while the flake and the ground are selling at from $2.90 to $2.95 per 100 pounds, in large drums, at works.

CHINA CLAY—The position of the china clay market is practically unchanged. Prices are holding to schedule. Imported china clay is quoted at from $13 to $21 per ton, ship side; while domestic paper making clay is selling at from $7 to $11 per ton, at mine.

CHLORINE—Steadiness prevails in the chlorine market. The contract movement is well up to average. Prices are holding to previously recorded levels, in most instances. Chlorine is quoted at $1.75 per 100 pounds, in tanks, or multi-unit cars, in large drums, at works.

ROSIN—The rosin market is weaker. Grades of gum rosin used in the paper mills are now quoted at from $5.50 to $6 per 280 pounds, in barrels, at yards. Wood rosin is still selling at $4.30 per 280 pounds, in barrels, car lot quantities, at southern shipping points.

SALT CAKE—Some improvement was noticed in the salt cake market during the past week. Prices remain unchanged. Salt cake is quoted at from $16 to $17; German salt cake at from $15.50 to $16; and chrome salt cake at from $14 to $15 per ton, in bulk, at works.

SODA ASH—The soda ash market is rather quiet. Supplies are moving into consumption, however, in fair volume. Prices remain unchanged. Quotations on soda ash, in car lots, at works, per 100 pounds, are as follows: in bulk, $1; in bags, $1.15; and in barrels, $1.38.

STARCH—Conditions in the starch market are fairly satisfactory. Shipments against contract are going forward to the paper mills at a normal pace for the season. Special paper making starch is still quoted at $2.67, in bags; and at $2.94 per 100 pounds, in barrels, at works.

SULPHATE OF ALUMINA—Most of the business transacted in the sulphate of alumina market was along routine lines. Commercial grades are still quoted at from $1.25 to $1.40; while iron free is selling at from $1.90 to $2.05 per 100 pounds, in barrels, at works.

SULPHUR—The sulphur market continues to exhibit a steady trend. Sulphur is quoted at $18 per long ton on orders of 1,000 tons, or over, on yearly contracts; and at $20 per ton for any smaller quantity over that period. On spot and nearby car loads, the quotation is $21 per ton.

TALC—Supplies of talc are going forward to the paper mills with fair regularity. Prices are holding to schedule. Domestic talc is quoted at from $16 to $18 per ton, in bulk; while imported talc is selling at from $18 to $22 per ton, in bags, ship side.

Market Quotations

Paper

(F. o. b. Mill)

Ledgers	11.00	@	38.00
Bonds	6.75	@	53.25
Writings—			
Extra Superfine	14.00	@	32.00
Superfine	14.00	@	32.00
Tub sized	10.00	@	15.00
Engine sized	6.75	@	11.00
Book, Cased—			
S. & S. C.	5.25	@	—
M. F.	5.00	@	—
Coated and Enamel	6.75	@	10.25
Lithograph	7.25	@	11.75
Tissues—Per Ream—			
White No. 1	.65	@	.70
Anti-Tarnish M. G. only	.65	@	.70
Colored	.70	@	.90
White No. 2	.55	@	.60
Kraft	.65	@	.70
Manila	.55	@	.60
Manila—			
No. 1 Jute	9.00	@	9.25
No. 2 Jute	7.75	@	8.50
No. 1 Wood	4.00	@	5.25
No. 2 Wood	3.50	@	4.00
Butchers	3.37½	@	—
Fibre Papers—			
No. 1 Fibre	4.25	@	5.50
No. 2 Fibre	4.00	@	4.75
Common Bogus	1.50	@	3.00
Screenings	2.00	@	3.00
Card Middles	4.00	@	5.00
Glassine—			
Bleached, basis 25 lbs., No. 1	.09¾	@	—
No. 2	.11¼	@	—
Bleached, basis 20 lbs.	.11¼	@	—

(Delivered New York)

News, per ton—			
Rolls, contract	57.00	@	—
Rolls, spot	57.00	@	—
Sheets	62.00	@	—
Side Runs	42.00	@	46.00
Kraft—			
No. 1 Domestic	4.25	@	5.30
No. 2 Domestic	3.50	@	4.00
Southern	3.50	@	4.00
Imported	6.00	@	7.00
Boards—per ton—			
News	30.00	@	32.50
Straw	40.00	@	45.00
Chip	27.50	@	30.00
Binders' Boards	65.00	@	70.00
Standard 85 Test Liner	32.50	@	35.00
Sgl. Mla. Lt. Chip	40.00	@	42.50

(F. o. b. Mill)

Wood Pulp Boards	70.00	@	80.00

Mechanical Pulp

(On Dock)

No. 1 Imported—			
Moist	27.00	@	30.00
Dry	30.00	@	34.00

(F. o. b. Mill)

No. 1 Domestic	25.00	@	30.00

Chemical Pulp

(On Dock, Atlantic Ports)

Sulphite (Imported)—			
Bleached	2.50	@	3.50
Easy Bleaching	2.15	@	2.35
No. 1 strong unbleached	1.90	@	2.35
Mitscherlich unbleached	2.05	@	2.25
No. 2 strong unbleached	1.80	@	2.00
No. 1 Kraft	1.40	@	1.70
No. 2 Kraft	1.35	@	1.55
Sulphate—			
Bleached	2.75	@	3.25

(F. o. b. Pulp Mill)

Sulphite (Domestic)—			
Bleached	2.25	@	4.75
Easy Bleaching	2.55	@	2.75
News	1.80	@	2.50
Mitscherlich	2.40	@	3.00
Kraft (Domestic)	1.60	@	2.75

(Delivered Paper Mills)

Soda Bleached	3.00	@	—

Domestic Rags

New Rags

(Prices to Mill f. o. b. N. Y.)

Shirt Cuttings—			
New White, No. 1	7.00	@	7.45
New White, No. 2	6.00	@	6.50
Silesias No. 1	5.25	@	5.50
New Unbleached	7.25	@	7.75
New Blue Prints	4.00	@	4.50
New Soft Blacks	3.50	@	4.00
Blue Overall	5.25	@	5.50
Fancy	3.50	@	3.75
Washables	3.00	@	3.25
Mixed Khaki Cuttings	3.75	@	4.25
Pink Corset Cuttings	5.50	@	6.00
O. D. Khaki Cuttings	4.75	@	5.00
Men's Corduroy	3.00	@	3.50
New Mixed Blacks	3.00	@	3.25

Old Rags

White, No. 1—			
Repacked	5.25	@	5.75
Miscellaneous	4.25	@	4.75
White, No. 2—			
Repacked	3.00	@	3.50
Miscellaneous	2.30	@	2.50
St. Soiled, White	1.50	@	1.75
Thirds and Blues—			
Repacked	2.25	@	2.50
Miscellaneous	1.65	@	1.85
Black Stockings	3.25	@	3.75
Roofing Rags—			
Cloth Strippings	1.25	@	1.30
No. 1	1.25	@	1.30
No. 2	.90	@	1.00
No. 3	.70	@	.80
No. 4	.65	@	.70
No. 5A	.50	@	.60

Foreign Rags

New Rags

New Dark Cuttings	2.00	@	2.15
New Mixed Cuttings	2.10	@	2.40
New Light Silesias	5.00	@	5.38
Light Flannelettes	5.00	@	5.25
Unbleached Cuttings	7.00	@	7.50
New White Cuttings	6.50	@	6.75
New Light Oxfords	5.00	@	5.50
New Light Prints	3.50	@	3.75

Old Rags

No. 1 White Linens	6.50	@	6.75
No. 2 White Linens	5.75	@	5.25
No. 3 White Linens	4.00	@	4.50
No. 4 White Linens	2.50	@	3.00
No. 1 White Cotton	4.50	@	5.00
No. 2 White Cotton	3.50	@	4.25
No. 3 White Cotton	2.50	@	3.25
No. 4 White Cotton	1.50	@	1.75
Extra Light Prints	2.50	@	2.75
Ord. Light Prints	2.00	@	2.25
Med. Light Prints	1.65	@	1.75
Dutch Blue Cottons	1.80	@	1.90
French Blue Linens	2.50	@	2.60
German Blue Linens	2.25	@	2.40
German Blue Cottons	1.75	@	1.85
Checks and Blues	1.60	@	1.75
Lindsay Garments	1.10	@	1.20
Dark Cottons	.75	@	.80
Old Shopperies	.70	@	.75
New Shopperies	.70	@	.75
French Blues	1.80	@	1.90

Old Rope and Bagging

(Prices to Mill f. o. b. N. Y.)

Gunny No. 1—			
Foreign	1.65	@	1.80
Domestic	1.65	@	1.80
Wool Tares, light	1.25	@	1.30
Wool Tares, heavy	1.25	@	1.30
Bright Bagging	1.20	@	1.30
Small Mixed Rope	.90	@	1.00
Manila Rope—			
Foreign	2.00	@	2.15
Domestic	2.10	@	2.25
New Burlap Cut	1.80	@	1.90
Hessian Jute Threads—			
Foreign	2.60	@	2.75
Domestic	2.80	@	3.00

Old Waste Papers

(F. o. b. New York)

Shavings—			
Hard, white, No. 1	2.75	@	2.85
Hard, white, No. 2	2.20	@	2.30
Soft, white, No. 1	2.20	@	2.30
White envelope cuttings	2.60	@	2.70
Flat Stock—			
Stitchless	.85	@	.95
Overissue Mag	.85	@	.95
Solid Flat Book	.75	@	.85
Crumpled No. 1	.60	@	.65
Solid Book Ledger	1.75	@	1.85
Ledger Stock	.80	@	.85
New B. B. Chips	.20	@	.30
Manilas—			
New Env. Cut	2.00	@	2.20
New Cuttings	1.50	@	1.65
Extra No. 1 old	1.20	@	1.30
Print	.50	@	.60
Bogus Wrapper	.50	@	.60
Container	.25	@	.30
Old Kraft Machine—			
Compressed bales	1.10	@	1.20
News—			
No. 1 White News	1.60	@	1.70
Strictly Overissue	.40	@	.45
Strictly Folded	.30	@	.35
No. 1 Mixed Paper	.15	@	.25
Common Paper			Nominal

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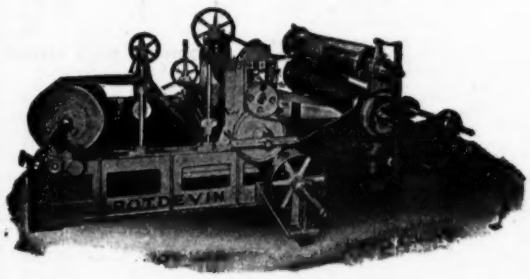
Three Widths—52" - 64" - 80"

LIGHT OR HEAVY COATING
WET OR DRY WAX
ONE OR BOTH SIDES



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PULP GRINDERS, THREE OR FOUR POCKET (Roller Bearings)

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KLONDYKE BRAND
FILLERS

Technical service available for coating and loading without charge. Write for samples.

EDGAR BROS. CO.
50 CHURCH ST. NEW YORK

Twines

(F. o. b. Mill)

Cotton—			
B. C., 18 basis	.32	@	.34
No. 1	.22	@	.24
No. 2	.21	@	.22
No. 3	.19	@	.20
A. Italian, 18 basis	.38	@	.39
Finished Jute—			
Dark, 18 basis	.20½	@	.21
Light, 18 basis	.22½	@	—
Jute Wrapping, 3-6 Ply—			
No. 1	.14¼	@	—
No. 2	.13¾	@	—
Tube Rope—			
4-ply and larger	.10¼	@	—
Fine Tube Rope—			
4-ply	.12¾	@	—
3-ply	.13¼	@	—
2-ply	.14¾	@	—
Paper Makers Twine Balls	.08¾	@	—
Box Twine, 2-3 ply	.09	@	.10
Jute Rope	.11	@	.12
Amer. Hemp, 6	.29	@	.31
Java Sisal—			
No. 1 Basis	.12	@	—
No. 2 Basis	.11¾	@	—
New Zealand Sisal	.11½	@	—
Sisal Lath Yarn—			
No. 1	.14	@	.16
No. 2	.12	@	.14
Manila Twine	.22½	@	.24½

CHICAGO

Paper

(F. o. b. Mill)

Rag Bond	.30	@	.53¼
Water Marked Sulphite Bond	.09	@	.12
Sulphite Bond	.06¾	@	.11
Superfine Writing	.18	@	.24
No. 1 Fine Writing	.14	@	.18
No. 2 Fine Writing	.12	@	.14
No. 3 Fine Writing	.08½	@	.12
No. 1 M. F. Book	.06½	@	.07¼
No. 2 M. F. Book	.05¼	@	.06¼
No. 1 S.&S.C. Book	.06¼	@	.07¾
No. 2 S.&S.C. Book	.05¾	@	.06½
Coated Book	.07½	@	.12
Coated Label	.07½	@	.10
No. 1 Manila	.04¼	@	.05¾
No. 1 Fibre	.04¼	@	.05¼
No. 2 Manila	.04¼	@	.04¾
Butcher's Manila	.04	@	.04½
No. 1 Kraft	5.00	@	5.50
Southern Kraft	3.75	@	4.00
No. 2 Kraft	3.75	@	4.00
Wood Tag Boards	.04¼	@	.06¼
Sulphite Screenings	.03	@	.03¾
Manila Tissue	.07	@	.07½
White Tissue	.07¼	@	.07½

(Delivered Central Territory)

News, per ton—			
Rolls, contract	62.00	@	—
Sheets	67.00	@	—
Boards, per ton—			
Plain Chip	30.00	@	35.00
Solid News	32.50	@	37.50
Manila Lined Chip	40.00	@	45.00
Container Lined—			
85 Test	50.00	@	55.00
100 Test	55.00	@	60.00

Old Papers

(F. o. b. Chicago)

Shavings—			
No. 1 Hard White	2.35	@	2.40
White Env. Cuttings	—	@	—
No. 1 Soft Shavings	2.10	@	2.15
Ledger & Writings	.70	@	.75
Solid Books	.75	@	.80
Blanks	1.60	@	1.65
Krafts	1.25	@	1.35
New Kraft Cuts	1.35	@	1.45
Manila Env. Cuts	1.50	@	1.55
Ex. No. 1 Manila	1.25	@	1.30
Print Manila	.40	@	.45
Overissue News	.40	@	.45
Old Newspapers—			
No. 1	.35	@	.40
No. 2	.30	@	.35
Mixed Papers—			
No. 1	.28	@	.30
No. 2	.20	@	.25
Roofing Stocks—			
No. 1	30.00	@	—
No. 2	28.00	@	—

PHILADELPHIA

Paper

(F. o. b. Mill)

Bonds	.05	@	.40
Ledgers	.07	@	.40
Writings—			
Superfine	.12	@	.18
Extra fine	.16	@	.22
Fine	.15	@	.26
Fine, No. 2	.13½	@	.25
Fine, No. 3	.08½	@	.20
Book, M. F.	.05	@	.07
Book, S. S. & C.	.05	@	.07½
Book, Coated	.08	@	.16
Coated Lithograph	.07	@	.11
Label	.07	@	.11
No. 1 Jute Manila	.07	@	.09
Manila Sul., No. 1	.03¼	@	.05½
Manila No. 2	.03	@	.04
No. 1 Kraft	.05¼	@	.06
No. 2 Kraft	.03½	@	.04
Southern Kraft No. 1	—	@	.03¾
Southern Kraft No. 2	—	@	.03¾
Common Bogus	.03	@	.04

(Delivered Philadelphia)

News Print Rolls	62.00	@	—
Straw Board	50.00	@	—
News Board	32.50	@	—
Chip Board	30.00	@	—
Wood Pulp Board	85.00	@	95.00
Binder Boards—			
No. 1, per ton	75.00	@	—
No. 2, per ton	68.00	@	—
Carload lots	66.00	@	70.00
Tarred Felts—			
Regular	55.50	@	57.00
Slaters (per roll)	.84	@	.94
Best Tarred, 1-ply (per roll)	1.95	@	2.10
Best Tarred, 2-ply (per roll)	1.50	@	1.60
Best Tarred, 3-ply	2.00	@	2.25

Domestic Rags (New)

(Price to Mill, f. o. b. Phila.)

Shirt Cuttings—			
New White, No. 1.	.06	@	.07
New White, No. 2.	.05½	@	.06
Light Silesias	.05	@	.05½
Silesias, No. 1	.06	@	.08
Black Silesias, soft.	.05	@	—
New Unbleached	.06½	@	.07
Washable, No. 1	.03	@	.03½
Blue Overall	.05	@	.05½
Cottons—According to grades—			
Washable, No. 2	.02	@	.02½
New Blue	.02	@	.02½
Fancy	.03½	@	—
New Black Soft	.03	@	.03½
New Light Seconds	.01¾	@	.02
New Dark Seconds	1.85	@	2.00
Khaki Cuttings—			
No. 1 O. D.	.04½	@	.05
No. 2 Mixed	.03½	@	.04
Corduroy	.02½	@	.03
New Canvas	.06½	@	.07
New Black Mixed	.03	@	.03½

Domestic Rags (Old)

White No. 1—			
Repacked	3.50	@	4.00
Miscellaneous	2.50	@	3.00
M. G.	4.50	@	—
Thirds and Blues—			
Miscellaneous	1.25	@	1.50
Repacked	1.75	@	2.00
Black Stockings (Export)	3.80	@	4.00
Roofing Stock—			
Foreign No. 1	1.15	@	1.25
Repacked	.80	@	.90

Bagging

(F. o. b. Phila.)

Gunny, No. 1—			
Foreign	1.50	@	1.60
Domestic	1.75	@	—
Manila Rope	2.50	@	2.75
Sisal Rope	1.25	@	1.50
Mixed Rope	1.10	@	1.25
Scrap Burlaps—			
No. 1	1.50	@	1.60
No. 2	1.10	@	1.20
Wool Tares, heavy	3.00	@	—
Mixed Strings	1.15	@	1.25
No. 1 New Light Burlap	2.50	@	2.75
New Burlap Cuttings	2.00	@	2.25

Old Papers

(F. o. b. Phila.)

Shavings—			
No. 1 Hard White	2.50	@	2.60
No. 2 Hard White	2.10	@	2.25
No. 1 Soft White	2.15	@	2.25
No. 2 Soft White	1.35	@	1.50
No. 1 Mixed	.80	@	.90
No. 2 Mixed	.55	@	.65
Solid Ledger Stock	1.50	@	1.60
Writing Paper	1.05	@	1.25
No. 1 Books, heavy	1.00	@	1.15
No. 2 Books, light	.90	@	.95
No. 1 New Manila	2.15	@	2.30
No. 1 Old Manila	1.40	@	1.50
Print Manila	.50	@	.60
Container Manila	.45	@	.50
Old Kraft	1.15	@	1.20
Common Paper	.25	@	.30
No. 1 Mixed Paper	.25	@	.30
Straw Board, Chip	.35	@	.40
Binders Board, Chip	.35	@	.45
Corrugated Board	.50	@	.60
Overissue News	.40	@	.45
Old Newspaper	.25	@	.30

BOSTON

Paper

(F. o. b. Mill)

Ledgers—			
Sulphite	.07½	@	.12½
Rag Content	.15	@	.30
All Rag	.38	@	.52½
Bonds—			
Sulphite	.06½	@	.11½
Rag content	.15	@	.30
All rag	.36½	@	.65
Writings	.06½	@	.20
Superfines	.11	@	.31
Book, Super	.06	@	.09
Book, M. F.	.05½	@	.08½
Book, Coated	.08½	@	.18
Coated Litho	.09	@	.12
Label	.09½	@	.15
Jute Manila No. 1	.11	@	.13
Manila, Sul. No. 1	.04¾	@	.06½
Manila, Sul. No. 2	.03¾	@	.04½
No. 1 Kraft	.04½	@	.05½
No. 2 Kraft	.03½	@	.04¾

(F. o. b. Boston)

Southern Kraft	.03½	@	.03¾

(F. o. b. destination in carload lots, f. o. b. mill in less than carload lots.)

Common Bogus	.02	@	.02¾

(Delivered New England points)

News Print, rolls	61.50	@	—
Straw Board, rolls	.009	—	@52.50
Straw Board in Sheets, basis 35s to 70s	—	@	50.00
Filled News Board	32.50	@	—
Chip Board	27.50	@	—
Chip Board (Creasing)	32.50	@	—
Single Manila Lined Chip	40.00	@	45.00
Single White, Patent Coated News Board—			
Binder, No. 1	60.00	@	75.00
Binder, No. 2	55.00	@	65.00
Wood Pulp Board	75.00	@	80.00
Binder Boards	67.50	@	75.00

Old Papers

(F. o. b. Boston)

Shavings—			
No. 1 Hard White	3.25	@	3.75
No. 2 Hard White	2.60	@	2.90
No. 1 Soft White	2.25	@	2.40
No. 2 Mixed	.60	@	.65
No. 1 Mixed	.90	@	1.00
Solid Ledger Books	1.75	@	2.00
Overissue Ledger Stock	1.35	@	1.60
Mixed Ledgers	1.15	@	1.30
No. 1 Books, heavy	.75	@	.90
No. 1 Books, light	.55	@	.70
Crumpled Stitchless Book Stock	1.00	@	1.25
Manila Env. Cuttings	1.85	@	2.00
No. 1 Old Manila	—	@	1.00
White Blank News	1.50	@	1.60
Kraft No. 1	—	@	1.10
Manila	.80	@	.90
No. 1 Mixed Paper	—	@	.16
Overissue News	—	@	.40
Old Newspapers	.25	@	.30
Box Board, Chip	.16	@	.20
Corrugated Boxes	.35	@	.45

Bagging

(F. o. b. Boston)

Gunny No. 1—			
Foreign	—	@	1.80
Domestic	1.60	@	1.70
Manila Rope—			
Foreign	—	@	2.00
Domestic	2.50	@	—
Transmission Rope	1.75	@	—
Mixed Strings	—	@	.70
Jute Rope	1.25	@	—
Jute Carpet Threads	.90	@	1.05
Bleachery Burlap	—	@	3.25
No. 1 Scrap Burlap	—	@	1.25
Scrap Sisal	1.40	@	1.50
Scrap Sisal for shredding	1.50	@	1.60
Wool Tares, heavy	1.30	@	—
New Burlap Cutting	1.75	@	2.00
Australian Pouches	2.50	@	—
Heavy Baling Bagging	—	@	1.75
Paper Mill Bagging	.95	@	1.10
Bagging No. 2	.50	@	—
No. 1 Burlap	—	@	3.50

Domestic Rags (New)

(F. o. b. Boston)

Shirt Cuttings—			
New White No. 1.	.06½	@	.07
New White No. 2.	—	@	.06
Silesias No. 1	.06	@	.06¼
New Black Silesias	.02½	@	.02¾
New Unbleached	—	@	.08
Fancy	.04	@	.04½
Washable	.04	@	.04½
Cottons—According to grades—			
Blue Overalls	.05	@	.06
New Black, soft	.04	@	.04¼
Khaki Cuttings	.04	@	.04½
O. D. Khaki	.04½	@	.05
Corduroy	.03	@	.03½
New Canvas	.08	@	.08½

Domestic Rags (Old)

(F. o. b. Boston)

Canvas	.04½	@	—
White No. 1—			
Repacked	4.75	@	5.25
Miscellaneous	—	@	4.00
White No. 2—			
Repacked	.04½	@	.05
Miscellaneous	.03½	@	.04
Twos and Blues	2.50	@	2.75
Thirds and Blues—			
Repacked	1.60	@	1.80
Miscellaneous	1.00	@	1.20
Black Stockings	3.25	@	3.50
Roofing Stock—			
No. 1	.75	@	.80
No. 2	.65	@	.70
No. 3	.50	@	.60

Foreign Rags

(F. o. b. Boston)

Dark Cottons	—	@	.75
New No. 1 White Shirt Cuttings	7.75	@	8.00
Dutch Blues	—	@	1.80
New Checks & Blues	4.00	@	4.50
Old Fustians	1.65	@	1.75
Old Linsey Garments	.85	@	.95

TORONTO

Paper

(F. o. b. Mill)

Bond—			
No. 1 Sulphite	.10¾	@	—
No. 2 Sulphite	08½	@	—
No. 1 Colored	.11¾	@	—
No. 2 Colored	.09	@	.10½
Ledgers (sulphite)	—	@	—
Ledgers, No. 1	.36	@	—
Ledgers, No. 2	.27	@	—
Writing	.09½	@	.10
Book—			
No. 1 M. F. (carloads)	6.65	@	—
No. 3 M. F. (carloads)	6.20	@	—
No. 1 S. C. (carloads)	7.15	@	—
No. 3 S. C. (carloads)	6.65	@	—
No. 4 S. C. (carloads)	5.70	@	—
No. 1 Coated and Litho	12.50	@	—
No. 2 Coated and Litho	11.50	@	—
No. 3 Coated and Litho	10.00	@	11.50
Coated tinted	14.00	@	—
Wrapping—			
Rag Brown	4.95	@	—
White Wrap	5.25	@	—
"B" Manila	5.00	@	—
No. 1 Manila	5.40	@	—
Fiber	5.40	@	—
Kraft, M. F.	5.90	@	—
Kraft No. 2	5.40	@	—

(Delivered Toronto)

News, per ton—			
Rolls (contract)	61.50	@	62.00
Sheets	67.00	@	—

Pulp

(F. o. b. Mill)

Ground Wood	30.00	@	32.00
Sulphite easy bleaching	50.00	@	—
Sulphite, news grade	70.00	@	—
Sulphite, bleached	62.50	@	75.00
Sulphate	60.00	@	—

Old Waste Paper

(In carload lots, f. o. b. Toronto)

Shavings—			
White Env. Cut	2.80	@	—
Soft White	2.60	@	—
White Blk. News	1.50	@	—
Book and Ledger—			
Flat Magazine and Book Stock (old)	1.10	@	—
Light and Crumpled Book Stock	1.20	@	—
Ledgers and Writings	—	@	—
Manilas—			
New Manila Cut	1.50	@	—
Printed Manilas	.80	@	—
Kraft	1.90	@	—
News and Scrap—			
Strictly Overissue	.70	@	—
Strictly Folded	.70	@	—
No. 1 Mixed Paper	.60	@	—

Domestic Rags

(Price to mills, f. o. b. Toronto)

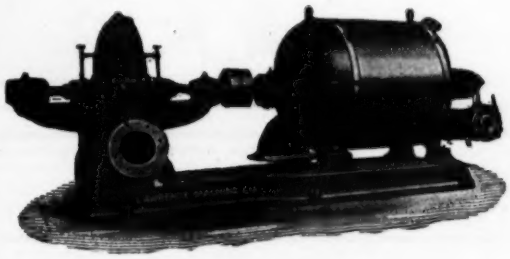
No. 1 White Shirt Cuttings	.09½	@	.10
Fancy Shirt Cuttings	.06	@	.06¼

Horizontally Split Casing Double Suction Pumps

LAWRENCE PUMPS

The name protects and guarantees you satisfaction.

We are the original designers and builders of the LAWRENCE PUMP.



Lawrence pumps for all conditions and services. Forty-four years of practical experience with centrifugal pump development places us among the leaders. Our efforts have been rewarded by the acceptance of our product in general.

Thousands of installations and the successful performance of our pumps should be sufficient proof of our ability to handle your pumping problems. Our engineering force is at your command.

Have only Lawrence Pumps, manufactured by the

Lawrence Machine & Pump Company

361 Market St. Lawrence, Mass.

MODERN TRENDS IN PAPER MAKING

SEAL BRAND

SILICATE OF SODA

If you are interested in cutting costs in your finishing room, investigate Seal Brand for capping your rolls.

It is odorless, convenient to use, quick-setting, and more economical than other adhesives.

Seal Brand is colored green to identify it from silicates intended for other purposes, for instance "S" Brand used in the beater.

May we help you to realize a substantial saving in your finishing room?

SILICATE HEADQUARTERS

PHILADELPHIA QUARTZ CO.

General offices and Laboratory

121 S. Third St., Philadelphia

Chicago office: 205 W. Wacker Drive

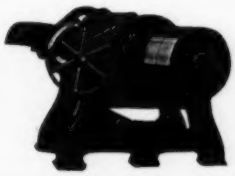
1831—BEGINNING ANOTHER CENTURY—1931

No. 3 of series

GIANT

RAGS — BURLAP
BAGGING — ROPE

JUTE BUTTS, MAGAZINES, CATALOGS OLD PAPERS, THREAD WASTE AND ALL GRADES OF RAGS CUT QUICKLY AND EFFICIENTLY WITH THE



TAYLOR, STILES & COMPANY — GIANT — REG. U.S. PAT. OFF. — RIEGELSVILLE, N.J. U.S.A.

This is the GIANT 2A CUTTER WITH A CAPACITY OF 3000 lbs. PER HOUR

GIANT RAG CUTTERS HAVE CAPACITIES OF FROM 1 to 5 tons per hour.

THE STANDARD OF THE WORLD FOR 59 YEARS

TAYLOR, STILES & COMPANY

RIEGELSVILLE, N. J.

CANADIAN REPRESENTATIVES

Waterous Engine Works Company, Ltd., Brantford, Ont., Canada

SOLE AGENTS FOR EUROPE

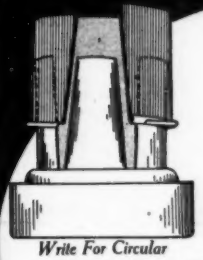
R. J. Marx, 133-139 Finsbury Pavement, London, E. C.

Cut Down The "Core Account"

By Using The

ONEIDA CHUCK

YOU CAN USE INEXPENSIVE PAPER CORES OR ROLLS WITHOUT CORES AND SAVE COST AND LABOR OF RETURNING CORES.



Key enters and expands slip, producing tight grip on inside of core end. Permits running down of paper to last thickness without damage to core. Safer, more efficient and economical than ordinary wedge chucks. Made to fit standard sizes of cores and shafts.

Write For Circular

JOHN WALDRON CORPORATION

Paper Converting Machinery Since 1827

MAIN OFFICE AND WORKS - NEW BRUNSWICK, N. J.

New York Chicago Portland, Ore.

100 Tons Kraft Per Day — 58% A. D.

With the Famous Kamyr Wet Machine

Production . . . .

Kraft	up to 100 Tons
Sulphite	up to 80 Tons
Soda	up to 60 Tons
Groundwood	up to 50 Tons

Results . . . . . .

With 1 Press	42% A.D.
With 2 Presses	55% A.D.
With 2 Presses & Predryer	58% A.D.

Saves . . . . . .

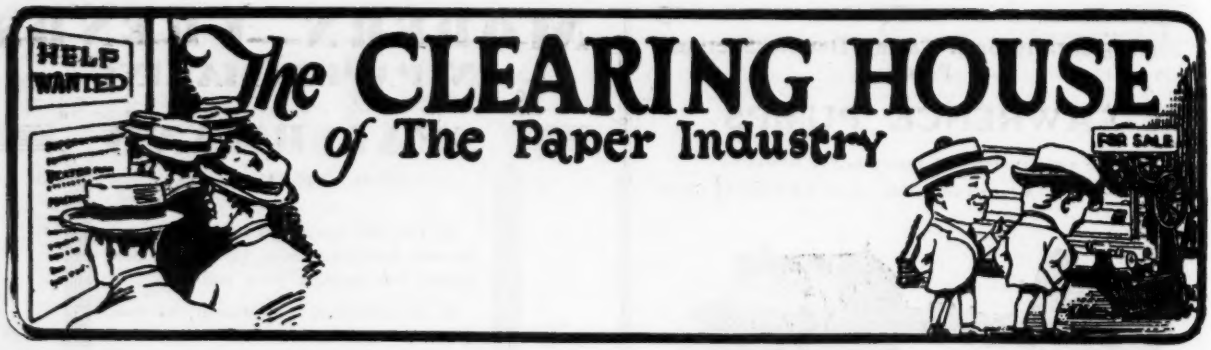
Felt, Wires, Labor, Upkeep, Power, Fibre, Floor Space

G. D. JENSSEN CO.

Chrysler Bldg., N. Y. C. ***Sole Agents in U. S. A. for*** **1017 White Bldg., SEATTLE**

PAPER MACHINERY Ltd.

MONTREAL



"SITUATIONS WANTED" ADVERTISEMENTS—4c a word, double rates for heavy face type. Minimum charge $1.00. If repeated ½ rate will be charged for each consecutive repetition.

"HELP WANTED" ADVERTISEMENTS—4c a word. Double rate for heavy face type. Minimum charge $1.00.

CLASSIFIED ADVERTISEMENTS—4c a word. Double rate for heavy face type. Minimum charge $1.00.
All classified "Help Wanted" and "Situation Wanted" advertisements are payable in advance.

HELP WANTED

PAPER SALESMAN — Familiar with New York City territory, to call on the buyer of fine and coarse papers—excellent opportunity offered capable man. Must be experienced. Address, Box 31-276, care Paper Trade Journal. Jn-25

SALESMAN WANTED who is familiar with and has had experience in selling jobbing and converting trade heavy weight sulphite papers and can produce business in the amount of not less than 8 or 10 tons daily on 70 lb. basis strong sulphite papers, plain or colored. Address, Box 31-257, care Paper Trade Journal. Jn-25

WANTED—Reputable agents or brokers to represent one of the higher class toilet paper manufacturers in the following territory: North and South Carolina, Texas, Georgia, Alabama, Mississippi, Louisiana and Tennessee—to handle full line of toilet tissues, napkins, towels and tissue specialties. In answering give full details as to present sales ability, lines you now carry, territory desired, recommendations and any other information that will be of value. Address, Box 31-265, care Paper Trade Journal. Jn-25

A MANUFACTURER OF BOXBOARD wants to get in touch with a superintendent for a large mill on liner and chip. They are only interested in an exceptionally able man. Address, Box 31-279, care Paper Trade Journal. Jl-9

IF YOU are open to overtures for new connections and qualified for a salary between $2,500 and $25,000, your response to this announcement is invited. The undersigned provides a thoroughly organized service, of recognized standing and reputation, through which preliminaries are negotiated confidentially for positions of the calibre indicated. The procedure is individualized to each client's personal requirements; your identity covered and present position protected. Established twenty one years. Send only name and address for details. R. W. Bixby, Inc., 117 Downtown Building, Buffalo, New York.

SALESMAN—To sell Kraft paper and specialties. Must have clientele. Give references and state salary in first letter. Address, Box 31-278, care Paper Trade Journal. Jn-25

CONFIDENTIAL EMPLOYMENT SERVICE for mills seeking good men and men seeking new positions. Charles P. Raymond Service, Inc., Paper Mill Dept., 294 Washington St., Boston. Jn-25

SITUATIONS WANTED

GOOD CYLINDER MACHINE TENDER open for position. Good on any grade of stock. Address, Box 31-285, care Paper Trade Journal. Jl-23

BOOKKEEPER-TYPIST: Full charge (female). Five years thorough experience paper and twine business. Fully capable of handling complete set of books. Unquestionable references. Address, Box 31-286, care Paper Trade Journal. Jl-9

SITUATIONS WANTED

POSITION as soda mill superintendent or assistant by man 44 years of age and married. Technical training. Many years soda mill experience. Address, Box 31-266, care Paper Trade Journal. Jn-25

PLANT ENGINEER—Experienced in design, construction, operation and maintenance of pulp and paper mills; desires new position. References furnished. Address, Box 31-267, care Paper Trade Journal. Jl-2

MASTER MECHANIC OF CHIEF ENGINEER, with 20 years of broad practical experience in construction, operation and maintenance of news, book and fine paper mills. Technical education. Executive ability and references. Available at once. Address, Box 31-270, care Paper Trade Journal. t.f.

PAPER BAG ADJUSTER on all type machines. 20 years experience. Available after June 13. Address, Box 31-264, care Paper Trade Journal. Jn-25

PLANT MANAGER—University graduate, 35 years old. Executive experience in management of paper mills and paper converting plants. Also duties of treasurer including finances, budgets, costs, analyses, etc. Experience in manufacture of cellulose wadding and facial tissue. Best references. Address, Box 31-255, care Paper Trade Journal. Jl-23

BOARD MILL SUPERINTENDENT open for position. Over 20 years practical experience on high grade specialties and folding box boards. Production and quality guaranteed. Excellent references. Address, Box 30-739, care Paper Trade Journal. t.f.

MECHANICAL SALES ENGINEER DESIRES COMMISSION, Foreign or Domestic. Broad experience in both fields, designing, selling, reporting, and executing paper machine propositions, all grades, from the raw to the finished stock. (Refer to Page 39 PAPER TRADE JOURNAL, May 21st issue, "BUSINESS MEN TO VISIT RUSSIA."—A competent representative should be desirable). Address, Box 31-258, care Paper Trade Journal. t.f.

SALESMAN—Young man, long experience in paper business, wishes connection as sales representative for mill or mill agents. Address, Box 31-263, care Paper Trade Journal. Jn-25

CELLULOSE CHEMIST—Research, development, and control work for five years. Rayon (Viscose process), pulp and paper, and allied cellulose products. Address, Box 31-287, care Paper Trade Journal. Jn-25

Address Replies
to advertisements appearing under Box Numbers in care of
PAPER TRADE JOURNAL
10 East 39th St
New York, N. Y.

SITUATIONS WANTED

A-1 PAPER MACHINE MILLWRIGHT—20 years experience, married, steady, sober, willing to go any where. Good references. Address, Box 31-251, care Paper Trade Journal. Jn-25

SUPERINTENDENT OR ASSISTANT—12 years experience on sulphite paper, bond, ledger, offset, writing, tablet; two years on rag paper. Age 45. Can furnish A-1 references. Practical paper maker. Address, Box 31-252, care Paper Trade Journal. Jl-16

FOREMAN SUPER CALENDERS—18 years experience. Thorough knowledge of machines and all grades of paper. Efficient. Good organizer. Address, Box 31-281, care Paper Trade Journal. Jl-2

SALESMAN with desirable merchant following in Philadelphia, middle western and southern territory, finds it necessary to make new connection through retrenchments of present employer. Has handled all grades except very coarse. Thirty-six years of age. Address, Box 31-282, care Paper Trade Journal. Jn-25

MANUFACTURERS—Aggressive young man wants one or more lines to represent exclusively in New England. Ten years experience coarse papers and specialties. Acquainted jobbers and converters. Address, Box 31-280, care Paper Trade Journal. Jl-9

FOR SALE

BUSINESS OPPORTUNITY—Complete paper mill formerly making tissues. Will sell as a going business, or will sell mill equipment as a unit. Property replacement value over $150,000. Will sell for small fraction. For full details address H. D. Warner Co., 110 High Street, Hartford, Conn. Jn-25

63" KIDDER, 2 drum, shear type Slitter and Rewinder complete with 8 slitters, 1 mill-roll and 2 rewind shafts. Good condition. Cheap. Address, Box 31-283, care Paper Trade Journal. Jl-2

FOR SALE
PAPER MILL MACHINERY

Noble & Wood Monarch Jordan
No. 2 Lannoye Pulper
No. 1 Lannoye Pulper
56" Super Calender
54" Norwood Super Calender, eight rolls, practically new.

FRANK H. DAVIS COMPANY
175 Richdale Avenue Cambridge, Mass.

SITUATIONS WANTED

SALES EXECUTIVE AND PROMOTION—Experienced technical and specialty papers, desires connection, mill or high class jobber. Address, Box 31-273, care Paper Trade Journal. Jn-25

WANTED

WANTED—Used Cameron Slitter, State type, width and serial number, also lowest price. Address, Box 31-240, care Paper Trade Journal. t.f.

MISCELLANEOUS

CLARK MANUFACTURING COMPANY, Holyoke, Mass. Telephone 1828. Builders of cylinder moulds, couch and felt rolls, dandy rolls. We cover dandies and cylinders tight, for fast running machines. tf.

WANTED—To represent manufacturer of merit on brokerage or commission basis. Well acquainted in Middlewest and Southwest with jobbers, distributors, manufacturers and large consumers. Experienced in coarse and fine papers and paper specialties. Headquarters in St. Louis. Address, Box 31-284, care Paper Trade Journal. Jl-9

Address Replies

to advertisements appearing under Box Numbers in care of

PAPER TRADE JOURNAL
10 East 39th St.,
New York, N. Y.

LIST YOUR WANTS HERE

FOR SALE

ELECTRICAL MACHINERY—Large stock New and Rebuilt Motors and Generators for sale. Attractive prices. Fully guaranteed. Write for list. V. M. NUSSBAUM & CO., FORT WAYNE, IND. Jn-25

CAMERON SLITTERS FACTORY REBUILT—in various sizes at attractive prices. Address, Box 30-723, care Paper Trade Journal. t.f.

One (1) Langston 132" Type "D" Slitter and Rewinder.

REGULAR EQUIPMENT: This machine is equipped with eight (8) sets of Cutters and one (1) Collapsible Shaft; one (1) Mill Roll Shaft complete with cones and cone tighteners, Brake and Brake band for tensioning the paper.

No reasonable offer refused.

CONSOLIDATED PAPER COMPANY,
Monroe, Michigan.
Jl-2

FOR SALE—SPECIAL ITEMS

1—5 lb. up to 2000 lb. Beaters.
1—72" Hamblet Duplex Cutter-bkstand.
1—72" Hamblet with Layboy.
1—90" Moore & White—bkstand.
1—10 Roll Super-Cal. 60" face.
1—9 Roll Super-Cal. 52" face.
1—No. 6 Cameron 62", 1—72" Langston Slitt. & Rew.
1—51" Seybold Cutter, 1—56"; 1—68" Die Press.
1—3 cyl. 66" Trim Board Machine.
1—4 cyl. 78" Trim Paper Machine.
1—5 cyl. 68" Trim Paper Machine.
1—Harper Fourdrinier 110" wide.
Vibrating Screens, Flat Screens, Jordans, Washers, Chippers, Grinders, Tube Machines, Wet Machines, Digesters, Rod and Tube Mills, Rotary Filters, Copper Kettles, Roller Mills, Shredders, Evaporators, Pulpers, Kilns, Barkers, Power Equipment.

CONSOLIDATED PRODUCTS COMPANY, INC.
15-18 Park Row, New York City Barclay 0600

FOR SALE

Twenty-eight tons Extra Quality Super News in 30" Rolls—Basis 24 x 38—45

Apply to

Arthur S. Zabriskie, Inc.

11 West 42nd St.
NEW YORK, N. Y.

FOR SALE

HAVE MILL suitable for binders board—Opportunity for experienced man with some capital to start up. Good location for raw stock, labor and finished products. Address, Box 30-702, care Paper Trade Journal. t.f.

PAPER COATING MACHINERY—Waxing, Oiling, Gumming, Gluing, Asphalt Duplexing, Varnish Insulating, Pyroxylin compounds, etc. Laboratory Coating and Treating machines. High Speed, new improvement. MAYER COATING MACHINES COMPANY, Inc., Rochester, N. Y. t.f.

BUSINESS OPPORTUNITY

YOUNG AND PROGRESSIVE paper distributor in New York City, with an enviable reputation, stocking excellent grades of mill brand printing papers, require a third partner who must be a real producer to be of any value to us. Financial investment is of secondary consideration. This is an unusual opportunity. Character, ability, experience, etc., will be the determining factors. Address, Box 31-277, care Paper Trade Journal. Jn-25

Rent vs. Interest

Are you paying rent for machinery, now in your plant that has become obsolete on account of your newer equipment?

Draw interest on your idle machinery—Stop paying rent.

It's good business to sell it to some one who can use it and the best way we know of is to advertise it here.

PAPER TRADE JOURNAL
10 E. 39th St., New York, N. Y.

LOCKWOOD'S DIRECTORY
OF THE PAPER AND ALLIED TRADES

1931 EDITION
The 56th Consecutive Annual Edition
CORRECTED UP-TO-DATE
Now ready for delivery
~ PRICE $7.50 ~

Contents

Entire contents classified under separate headlines for the United States and Canada, alphabetically and geographically arranged by states.
City Addresses of Mills and Mill Supply Houses
Classified List of Paper Mill Products
Classified List of Pulp Mill Products
Coated Paper Manufacturers
Envelope Manufacturers
Glazed and Coated Paper Manufacturers
Idle Mills
Mill Officials
Pad Manufacturers
Paper Merchants
Paper Stock and Rag Dealers
Paper Bag Manufacturers
Paper Box Manufacturers
Paper Wood Pulp and Chemical Fiber Mills of the United States, Canada, Cuba, Mexico and South America
Paper Specialties Manufacturers
Papeterie Manufacturers
Etc., etc., etc.

LOCKWOOD TRADE JOURNAL CO.
10 E. 39th Street ~ New York, N.Y., U.S.A.

Water Tube Boilers
Superheaters
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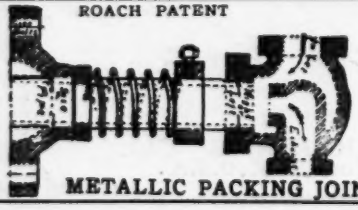
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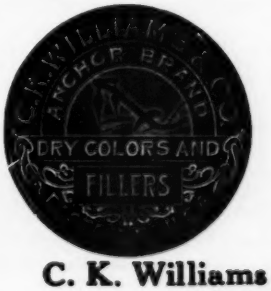

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Paper, Wood Pulp and Chemical Fiber Mills of the United States, Canada, Cuba, Mexico and South America
Paper Specialties Manufacturers
Papeterie Manufacturers
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Rags and Paper Stock Consumed by the Paper Mills
Stationers in United States, Porto Rico, Canada, Cuba, Hawaiian Islands and the Philippine Islands
Statistical Table of Mills
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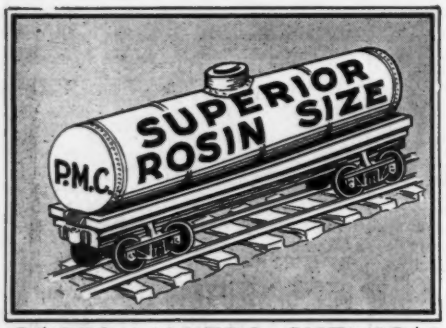

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Stebbins Engineering & Mfg. Co.
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De Laval Steam Turbine Co.
Oliver United Filters Inc.
Ryther & Pringle Co.
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Stebbins Engineering & Mfg. Co.
ACID PROOF LININGS
Stebbins Engineering & Mfg. Co.
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Jenssen Company, G. D.
ADDING MACHINE ROLLS
Paper Manufacturers Co., Inc.
AGALITE
Union Talc Co.
AGITATOR EQUIPMENT
Valley Iron Works
AIR DRYING MACHINERY
Waldron, John, Corp.
AIR PREHEATING UNITS
Air Preheater Co.
Babcock & Wilcox Co.
Ross Engineering Corp., J. O.
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Emerson Mfg. Co.
Hauser-Stander Tank Co.
Mid-West Fulton Machine Co.
Moore & White Co.
Noble & Wood Machine Co.
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Shartle Bros. Machine Co.
Valley Iron Works Co.
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Air Preheater Co.
Babcock & Wilcox Co.
Biggs Boiler Works Co.
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Alloy Steel Products.
Chromium Corporation of America.
ALUM
Kalbfleisch Corporation, The
Pennsylvania Salt Mfg. Co.
ALUM DISSOLVING JETS
Duiron Company, Inc.
ALUM DISSOLVING SYSTEM
Duiron Company, Inc.
AMERICAN STOCK FILTERS
Magnuson Products Corp.
AMMONIA, Anhydrous
Mathieson Alkali Works, Inc.
AMMONIA Aqua
Mathieson Alkali Works, Inc.
ANALYSIS AND TESTS
Electrical Testing Laboratories
Little, Inc., Arthur D.
U. S. Testing Laboratories
APPRAISALS
Chemical Process Inc.
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Ferguson Co., H. K.
Ferguson, Hardy S.
Hardy, George F.
Jenssen Company, G. D.
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Lefren, K. A.
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Simons, V. D.
Smith, F. L.
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Taylor, H. S.
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Hendrick Mfg. Co.
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Layne & Bowler, Inc.
ASBESTINE PULP
International Pulp Co.
ASH BUNKERS
Link-Belt Co., The
ASH CONVEYORS
Link-Belt Co., The
ASH GATES (Water Collecting)
Link-Belt Co., The
ASH HOPPERS
Link-Belt Co., The
AUTOMATIC SCALES
Richardson Scale Co.
AUTOMATIC WEB GUIDES
Waldron, John, Corp

AUTOMATIC WATER FEEDER
Merritt Engineering & Sales Corp., The
AUTOMATIC WHITE WATER SAMPLERS
Montague Machine Co.
AUTOMATIC WATER JETS FOR CLEANING
Montague Machine Co.
BABBITT METAL
Hardy & Sons Co., Wm. A.
Monarch Metal Co., The
BACKING WIRES
Appleton Wire Works
International Wire Works
Tyler Co., W. S. of America
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Heinrich Inc., H. H.
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Allis Chalmers Mfg. Co.
Appleton Machine Co., The
Baker Manufacturing Corp.
Green Bay Barker Machine & Tool Works.
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Bolton, John W. & Sons, Inc.
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Baker Manufacturing Corp.
Biggs Boiler Works
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Manitowoc Eng. Works
Murray, D. J. Mfg. Co.
BARK PRESSES
Fibre Making Process, Inc.
BEARING METAL
Monarch Steel Co., The
BEARINGS (Tapered Roller)
Timken Roller Bearing Co.
BEARINGS (Trust)
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Dayton Beater & Hoist Co.
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Mid West-Fulton Machine Co., The
Shartle Bros. Machine Co.
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Noble & Wood Machine Co.
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Dayton Beater & Hoist Co.
Mid-West Fulton Machine Co.
Shartle Bros. Machine Co.
BEATER ROLL GRINDERS
Dayton Beater & Hoist Co.
Mid West-Fulton Machine Co., The

BEATER STOCK RECORDER
Merritt Engineering & Sales Corp., The
BEATER VALVES
Dayton Beater & Hoist Co.
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Perkins & Sons, Inc., B. F.
DANDY ROLLS
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Bird Machine Company
Glens Falls Machine Co.
Oliver United Filters Inc.
Shartle Bros. Machine Co
Valley Iron Works
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Merritt Engineering & Sales Corp., The
DESUPERHEATERS
Babcock & Wilcox Co.
DIE CUTTERS
Appleton Machine Co., The
Biggs Boiler Works
DIFFUSERS
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Manitowoc Eng. Works
DIGESTER FITTINGS
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Duriron Company Inc., The
Stebbins Engineering & Mfg Co.
DIGESTER LININGS
Stebbins Engineering & Mfg. Co.
DIGESTERS (Experimental)
Alloy Steel Products Co.
DIGESTERS (Sulphate and Sulphite)
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Downingtown Iron Works, The
Manitowoc Eng. Co.
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Bird Machine Co.
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Link-Belt Co., The
Philadelphia Gear Works
Shartle Bros. Machine Co.
DRIVES (SHORT CENTER)
Bird Machine Co., (Pulmax Drive Div.)
Link-Belt Co., The
DRIVES (Spiral)
Link Belt Co.
Philadelphia Gear Works
DRIVER DRAINAGE SYSTEMS
Mid West-Fulton Machine Co.,
DRYER EXHAUSTS
Nash Engineering Co., The
DRYER DOCTORS
Bird Machine Company
DRYER JOINTS
Baker Manufacturing Corp.
Shartle Bros. Machine Co.
DRYERS
Baker Manufacturing Corp.
Biggs Boiler Works Co
Horne & Sons Co., J. H.
Manitowoc Eng. Works
Shartle Bros. Machine Co.
DRYING SYSTEMS
Mid West-Fulton Machine Co., The
Pickles, W. F.
Ross Engineering Co., J. O.
Stickle Steam Specialties Co.
Waldron Corporation, The
DUST COLLECTOR PIPE
Naylor Pipe Co.
DUSTING MACHINERY
Jones & Sons Co., E. D.
Norwood Engineering Co.
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General Dyestuff Corp.
Heller & Merz
National Aniline & Chem. Co.
Geigy Colour Co., The
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ELECTRIC TRAVELING CRANES
Box Crane & Hoist Corp.
ELECTRIC EQUIPMENT
Allis Chalmers Mfg. Co.
Cutler-Hammer Mfg. Co.
General Electric Co.
ELEVATORS
Caldwell & Son Co., H. H.
EMBOSSING CALENDERS
Norwood Engineering Co.
Perkins & Sons, Inc., B. F.
Textile Finishing Machinery
EMBOSSING MACHINES
Paper Converting Machine Co. Inc.
John Waldron Corp.
EMBOSSING MACHINE (Napkin)
Paper Converting Machine Co.
John Waldron Corp.
ENGINEERS
E. R. Barker
Layne & Bowler, Inc.
ENGINES (STEAM)
Allis Chalmers Mfg. Co.
Murray Iron Works
ENVELOPE MACHINES
Potdevin Machine Co.
ESTIMATES
Chemical Process, Inc.
EVAPORATORS
Murray, D. J. Mfg. Co.
EXTRACTORS
Baker Manufacturing Corp.
Dayton Beater & Hoist Co.
Mid-West Fulton Machine Co.
Valley Iron Works Co.
FANS
Ross Engineering Corp., J. O.
FAN PUMPS
Lawrence Mach. and Pump Co.
Moore & White Co.
Valley Iron Works Co.
FANS (Ventilating)
Perkins & Son, Inc., B. F.
Ross Engineering Corp., J. O.
FEED WATER HEATER
Stickle Steam Specialties Co.
FELT CARRIER ROLLS
American Wringer Co.
FELT CONDITIONERS
Baker Manufacturing Corp.
FELTS AND JACKETS
Albany Felt Co.
Appleton Woolen Mills
Bulkley, Dunton & Co.
Draper Bros. Co.
Fitchburg Duck Mills
Huyck & Son, E. C.
Lockport Felt Co.
Orr Felt & Blanket Co.
Shuler & Benninghofen
Turner, Halsey Co.
Waterbury Felt Co.
FIBRE CROSSERS
Baker Corp. The
FILTERS
Filtration Engineers, Inc.
Glens Falls Machine Works
Inver sand Company
Moore & White Co.
J. O. Ross Engrg. Corp.
Oliver United Filters, Inc.
FILTERS (Gravity Type)
Magnuson Products Corp.
FILTER WIRES
Appleton Wire Works
Oliver United Filters Inc.
FILTERING SYSTEMS
Hungerford & Terry, Inc., The
Norwood Engineering Co.
Oliver United Filters Inc
FITTINGS (Chrome Nickel)
Alloy Steel Products Co.
FIXTURES (Towel, Toilet, Napkin)
Griffith Hope Co.
FLAT SCREENS
Bird Machine Company
Glen Falls Machine Co.
FLEXIBLE COUPLINGS
Allis Chalmers Mfg. Co.
Baker Manufacturing Corp.
De Laval Steam Turbine Co.
Jones Foundry & Machine Co., W. A.
Link Belt Co.
John Waldron Corp.
FLOOR PLATES
American Pressed Steel Co.
FLOOR TILE (Non-Slip)
Norton Co.
FLOORS (Engine & Machine Room)
Magnuson Products Corp.
FLOW METER
General Electric Co.
FLY BARS
Dayton Beater & Hoist Co.
Jones & Sons Co., E. D.
Mid-West Fulton Machine Co.
Noble & Wood Machine Co.
FOLDING MACHINES (Single Type)
Norwood Engineering Co.
FOLDING MACHINES
Paper Converting Machine Co. Inc.
Waldron, John, Corp.
FOURDRINIER PAPER MACHINES
Horne & Sons Co., J. H.
Moore & White Co.
FOLDING TESTERS
Foreign Paper Mills, Inc.
FOURDRINIER WIRES
Appleton Wire Works
Green Bay Wire Works
International Wire Works
Neumeyer & Dimond
Wisconsin Wire Works
FOURDRINIER WIRES (Rolled)
Wisconsin Wire Works
FREENESS TESTERS
Testing Machines, Inc.
FRICTION CALENDERS
Norwood Engineering Co.
Perkins & Son, Inc., B. F.
FRICTION CLUTCHES
Allis Chalmers Mfg. Co.
Link-Belt Co., The
Moore & White Co.
GEARS
De Laval Steam Turbine Co.
Link Belt Co., The
Philadelphia Gear Works
GEARS (Machine Cut)
De Laval Steam Turbine Co.
Limited, Charles
Link-Belt Co., The
Philadelphia Gear Works
GEARS AND PINIONS
Link-Belt Co., The
Moore & White Co.
Philadelphia Gear Works
GENERATORS
Allis Chalmers Mfg. Co.
De Laval Steam Turbine Co.
General Electric Co.
GRANITE PLATES
Green Bay Foundry & Mach Works
GRANITE ROLLS CHINES
Perkins & Son, Inc., B. F.
GREASES
Vacuum Oil Co.
GRATING (SIDEWALK)
Hendrick Mfg. Co.
GREY IRON CASTINGS
Ryther & Pringle Co.
GRINDER VALVES
Glens Falls Machine Works
Nortmann-Duffke Co.
GRINDING WHEELS
Norton Co.
GROUND WOOD
Borregaard Co., Inc
GUIDES (Automatic Web)
John Waldron Corp.

GUIDES (FELT)
Moore & White Co.
Shartle Bros. Machine Co
GUMMED TAPE TESTERS
Thwing Instrument Co.
GUMMING AND GLUING MACHINERY
Potdevin Machine Co.
Shartle Bros. Machine Co.
Waldron Corporation, John
GUMMED SEALING TAPE
Paper Manufacturers Co.
HANGERS
Link-Belt Co., The
HAND TRUCKS
Fairbanks Co.
HEAD BOXES
Magnuson Products Corp.
HEATERS (Unit)
J. O. Ross Engrg. Corp.
HEAT EXCHANGERS
Babcock & Wilcox Co.
HEATING AND VENTILATING SYSTEMS
Air Preheater Corp.
Ross Engineering Corp., J. O.
Stickles Steam Specialties Co.
HIGH DENSITY THICKENERS
Oliver United Filters, Inc.
Moore & White Co.
HOISTS (Electrical)
Allis Chalmers Mfg. Co.
HOIST (Headgate)
Dayton Beater & Hoist Co.
Hunt Machine Co., Rodney
HOISTS (ELECTRIC)
General Electric Co.
HYDRO-ELECTRIC DEVELOPMENTS
Johnson & Wierk, Inc.
Montague Machine Co.
Smith S. Morgan
HYDRAULIC TURBINES
Allis Chalmers Mfg. Co.
De Laval Steam Turbine Co.
Smith S. Morgan
HYDROGEN-ION APPARATUS
Cambridge Instrument Co.
HYGROMETERS, PAPER STOCK
Cambridge Instrument Co.
HYGROMETER AND TENSILE TESTERS
Foreign Paper Mills Inc.
INCINERATORS
Manitowoc Eng. Works
INDICATORS
Taylor Instrument Co.
INSPECTIONS
Electrical Testing Lab.
United States Testing Co.
INTERFOLDING MACHINES
Paper Converting Machine Co. Inc.
JORDAN CONTROL
Lewellen Manufacturing Company
JORDAN ENGINES
Appleton Machine Co.
Horne & Sons Co., J. H.
Jones & Sons Co., E. D.
Noble & Wood Machine Co.
Shartle Bros. Machine Co.
Valley Iron Works
JORDAN FILLINGS
Bahr Bros. Mfg. Co., The
Horne & Sons Co., J. H.
Jones & Sons Co., E. D.
Noble & Wood Machine Co.
Shartle Bros. Machine Co.
Valley Iron Works
JORDAN INTAKE REGULATORS
Baker Manufacturing Corp.
KETTLES (Steam Jacketed)
Biggs Boiler Works Co.
KNEADER
Baker Corp. The
KNIVES, ETC.
Baker Manufacturing Corp
Carthage Machine Co.
Dilts Machine Works, Inc
Simonds-Worden-White Co.
Shartle Bros. Machine Co.
Taylor, Stiles & Co
KNOT SAWING MACHINES
DeZurik Shower Co., The
KNOTTERS
Baker Corp. The
Fibre Making Process, Inc.
Glens Falls Machine Co.
KRAFT PAPER
Jones, W. C., Inc.
LABORATORY EQUIPMENT
Thwing Instrument Co.
Valley Iron Works
LABORATORY FURNACE
Babcock & Wilcox Co.
LAY BOYS
Moore & White Co.
LIME MUD FILTERS
Oliver United Filters Inc.
LIQUID CHLORINE
Electro Bleaching Gas Co.
Hooker Electrochemical Co.
Kalbfleisch Corp.
Mathieson Alkali Works, Inc
LOG HAULS
Ryther & Pringle Co.
LOFT DRYERS
Ross Engineering Corp., J. O.
John Waldron Corp.
LUBRICANTS
Vacuum Oil Co.
MECHANICAL STOKERS
Babcock & Wilcox Co.
METAL (Babbitt)
Monarch Metal Co., The
METALLIC PACKING JOINTS
Reliable Machine Co.
MICROSCOPE
Bausch & Lomb Optical Co.
MIMEOGRAPH PAPER
Jones, W. L., Inc.
MOTORS
Allis Chalmers Mfg. Co.
General Electric Co.
NAPKIN FOLDERS
Paper Converting Machine Co
NAPKIN FOLDING MACHINES
Paper Converting Machine Co. Inc.
Waldron, John, Corp.
NAPKIN DISPENSERS
Griffin-Hope Co.
NON-CORROSIVE METALS
Duriron Company Inc., The
OILS AND GREASE
Vacuum Oil Co.
OIL BURNERS
Babcock & Wilcox Co.
OPERATING SURVEYS
Chemical Process Inc.
PACKING
Jenkins Bros.
Green Tweed & Co.
PAPER BAG BUNDLING MACHINERY
Potdevin Machine Co., The
PAPER BAG MACHINERY
Coty Machine Company, Inc.
Heinrich Inc., H. H.
Potdevin Machine Co
Smith & Winchester Mfg. Co.
PAPER BAG MACHINERY (ALL TYPES)
Potdevin Machine Co., The
PAPER BREAK RECORDERS
Thwing Instrument Co.
PAPER CUTTERS
Hamlet Machine Company
Inman Manufacturing Co.
Moore & White Co.
Shartle Bros. Machine Co.
Smith & Winchester Mfg. Co
PAPER CALENDER ROLLS
Perkins & Son, Inc., B. F.
PAPER DAMPENERS
Perkins & Son, Inc., B. F.
PAPER GUILLOTINE
Heinrich, Inc., H. H.
PAPER DUSTERS
Moore & White Co.
PAPER MANUFACTURERS
Brown Company
Hammermill Paper Co.
Kalamazoo Vegetable Parchment Co
Oxford Paper Co
West Virginia Pulp & Paper Co.
PAPER MACHINE HOODS
Ross Engineering Corp., J. O
Stickles Steam Specialties Co.
PAPER MILL SUPPLIES
Castle & Overton, Inc.
PAPER AND BOARD CUTTERS
Horne & Sons Co., J. H.
PAPER AND PULP MACHINERY
Appleton Machine Co.
Bagley & Sewall Co.
Baker Manufacturing Corp.
Beloit Iron Works
Biggs Boiler Works, The
Bird Machine Co.
Black-Clawson Co.
Clark-Aiken Co.
Davis, Frank H.
Dayton Beater & Hoist Co.
Dominion Engineering Co.
Downingtown Mfg. Co.
Farrel-Birmingham Co.
Glens Falls Machine Co.
Green Bay Foundry & Mch. Works.
Lobdell Car Wheel Co.
Mid-West Fulton Machine Co.
Montague Machine Co.
Moore & White Co.
Noble & Wood Machine Co.
Paper Machy. Ltd.
Paper & Textile Machinery Co.
Perkins & Son, Inc., B. F.
Pusey and Jones Corp.
Rice Barton-Falen, Inc.
Ryther & Pringle Co.
Shartle Bros. Machine Co.
Smith & Winchester Mfg. Co.
Trimbey Machine Works
Valley Iron Works Co.
Waterville Iron Works
PAPER AND PULP MILL BROKERS
Gibbs-Brower Co
PAPER ROLL PLUGS
Wood Products Co.
PAPER SCALES
Foreign Paper Mills Inc.
Thwing Instrument Co.
PAPER STOCK DEALERS
Castle & Overton, Inc.
PAPER STOCK WASHERS
Dayton Beater & Hoist Co.
Jones & Sons Co., E. D.
PAPER SCREENS
Bird Machine Company
Shartle Bros. Machine Co.
PAPER TESTERS
Foreign Paper Mills Inc.
Perkins & Son, Inc., B. F.
Thwing Instrument Co.
Valley Iron Works Co.
PAPER TRIMMING KNIVES
Simonds-Worden-White Co.
PAPER TUBE MACHINERY
Dietz Machine Works
Potdevin Machine Co., The
PAPER WAXING MACHINERY
Gibbs-Brower Co.
Potdevin Machine Co.
Waldron Corporation, John
PENSTOCKS
Biggs Boiler Wks.
Taylor Forge & Pipe Works
PERFORATING MACHINES
Dietz Machine Works
Waldron, John, Corp.
PERFORATED DRAINERS
Nortmann-Duffke Co.
PERFORATED METAL
Allis Chalmers Mfg. Co.
Harrington & King Perforating Co.
Hendrick Mfg. Co.
Mundt & Sons, Charles
Nortmann-Duffke Co.
PINE OIL
Hercules Powder Co.
PIPE (Chrome Nickel)
Alloy Steel Products Co.
PIPE (Large Water Supply)
Biggs Boiler Works Co.
PIPE (Steel Riveted & Welded)
Biggs Boiler Works Co.
PIPE (Spiralweld)
Naylor Pipe Co.
PIPE (Steel)
Naylor Pipe Co.
PIPE (Toncan Iron)
Naylor Pipe Co.
PIPE FITTINGS
Naylor Pipe Co.
Walworth Company
PIPING
Babcock & Wilcox Co.
Naylor Pipe Co.
PLATING, CHROMIUM
Chromium Corp. of America
Norwood Engineering Co.
PLATERS
Perkins & Son, Inc., B. F.
PLAYING CARD MACHINERY
Waldron, John, Corp.
PLUGS
Wood Products Co. Inc.
POWER PUMPS
Buffalo Steam Pump Co.
POWER TRANSMISSION EQUIPMENT
De Laval Steam Turbine Co.
Hunt Machine Co., Rodney
Link Belt Co.
PRECISION INSTRUMENTS
Foreign Paper Mills Inc.
Thwing Instrument Co.
Presses (Napkin)
Paper Converting Machine Co
PRESS ROLLS
American Wringer Co., Inc.
Appleton Machine Co., The
Baker Manufacturing Corp.
Goodrich Rubber Co.
Horne & Sons Co., J. H.
Paper Mchy. Ltd.
Shartle Bros. Machine Co.
Valley Iron Works Co.
PRESS ROLL DOCTORS
Bird Machine Company
PRESS ROLLS (Granite)
Perkins & Son, Inc., B. F.
PRESSURE CONTROL SYSTEMS
Link Belt Co., The
Mid West-Fulton Machine Co.
Stickles Steam Specialties Co
PRESSURE REGULATORS
Davis Regulator Co.
PRINTING MACHINES
Heinrich, Inc., H. H.
Waldron, John, Corp.
PRINTING PRESSES
Paper Converting Machine Co. Inc.
PULLEYS
Link-Belt Co., The
PULLEYS (Semi-Steel)
Link Belt Co.
PULP AND PAPER MACHINERY
Horne & Sons, Co., J. H.
PULP & PAPER MILL MACHINERY
Paper & Textile Mach. Co.
Pusey and Jones Corp.
PULPERS
Noble & Wood
PULPSTONES
Norton Co.
PULP DECKERS
Bird Machine Company
Filtration Engineers, Inc.
PULP GRINDERS
Glens Falls Machine Works
Green Bay Barker Machine & Tool Works
Montague Machine Co.
PULPS (KRAFT)
Borregaard Co., Inc., The
Lagerloef Trading Co., Inc.
PULP REFINER
Baker Corp. The
Wiener, John, A.
PULP SCREENS
Bird Machine Company
PULPS (SULPHITE)
Lagerloef Trading Co., Inc.
PULPS (MECHANICAL)
Lagerloef Trading Co., Inc.
PULP SHREDDER
Waterville Iron Works
PULP TESTING
U. S. Testing Co.
PULP THICKENERS
Bird Machine Company
Filtration Engineers, Inc.
Glens Falls Machine Co.
Moore & White Co.
Oliver United Filters Inc.
Shartle Bros. Machine Co.
PULP WASHERS
Bird Machine Company
Filtration Engineers, Inc.
Glens Falls Machine Works
Oliver Continuous Filter Co.
Pulp Bleaching Corp.
PULP WOOD CHIPPERS
Waterville Iron Works
PUMP PRIMERS (Steam and Water Jet)
Appleton Machine Co., The
Lawrence Mach. and Pump Co.
Noble & Wood Machine Co.
Shartle Bros. Machine Co.
Valley Iron Works Co.
Warren Steam Pump Co.
PUMPS (Acid)
Baker Manufacturing Corp.
De Laval Steam Turbine Co.
Frederick Iron & Steel Co.
PUMPS (Acid Centrifugal)
Baker Manufacturing Corp.
De Laval Steam Turbine Co.
Frederick Iron & Steel Co.
Lawrence Mach. & Pump Co.
Moore & White Co.
Nash Engineering Co.
Noble & Wood Machine Co.
Oliver United Filters Co.
Shartle Bros. Machine Co.
Valley Iron Works
Warren Steam Pump Co.
PUMPS (Centrifugal)
Baker Manufacturing Corp.
Buffalo Steam Pump Co.
Layne & Bowler Inc.
Moore & White Co.
PUMPS (Deep Well)
Layne & Bowler Inc.
PUMPS (Rotary Cycloidal)
Baker Manufacturing Corp.
Lawrence Mach. and Pump Co.
PUMPS (Stuff)
De Laval Steam Turbine Co.
Emerson Mfg. Co.
Lawrence Mach. & Pump Co.
Frederick Iron & Steel Co.
Moore & White Co.
Nash Engineering Co.
Shartle Bros. Machine Co.
Valley Iron Works Co.
Warren Steam Pump Co.
PUMPS (Stock)
Baker Manufacturing Corp.
Frederick Iron & Steel Co.
Shartle Bros. Machine Co
Warren Steam Pump Co.

PUMPS (Suction)
Mid West-Fulton Machine Co.
Moore & White Co.
Nash Engineering Co.
PUMPS (Vacuum)
Lawrence Mach. & Pump Co
Nash Engineering Co., The
Walmsley & Co., (Canada) Limited, Charles
Warren Steam Pump Co.
PYROMETERS (Roll)
Cambridge Instrument Co.
Thwing Instrument Co.
RADIAL ROLLER
Bantam Ball Bearing Co., The
RAG CUTTERS
Clark-Aiken Co.
Perkins & Son, Inc., B. F.
Taylor Stiles & Co.
RECORDING INSTRUMENTS
Brown Instrument Co.
Cambridge Instrument Co.
Taylor Instrument Co.
Thwing Instrument Co
RECORDING TACHOMETERS
General Electric Co.
RECOVERY SYSTEMS (Waste Heat)
J. O. Ross Engrg. Corp.
RECOVERY SYSTEMS (Soda & Sulphite)
Ross Engineering Corp., J. O.
REDUCTION GEARS
Farrel-Birmingham Co., Inc.
Link-Belt Co., The
Mid West-Fulton Machine Co.,
Philadelphia Gear Works
REELS (Upright & Revolving)
De Laval Steam Turbine Co.
Hunt Machine Co., Rodney
Moore & White Co.
REFINERS (Centrifugal)
Baker Manufacturing Corp.
Bahr Bros.
Bird Machine Co.
Manitowoc Eng. Works
Tolhurst Machine Co.
REFINING ENGINES
Emerson Mfg. Co.
Jones & Sons Co., E. D.
Shartle Bros. Machine Co
REFRACTORIES
Babcock & Wilcox Co.
Norton Co.
REFRACTORIES (Cement)
Babcock & Wilcox Co.
REHEATERS
Babcock & Wilcox Co.
RESUPERHEATERS
Babcock & Wilcox Co.
REWINDERS
Inman Manufacturing Co.
Moore & White Co.
John Waldron Corp.
ROD MILL
Allis Chalmers Mfg. Co.
Green Bay Foundry & Mach Works
Mine & Smelter Co.
Shartle Bros. Machine Co
ROLL GRINDERS
Dayton Beater & Hoist Co
Farrel-Birmingham Co., Inc
Lobdell Car Wheel Co
ROLL SLITTING MACHINES
Goebel, A. C.
ROLL STANDS
Moore & White Co.
ROLLED STEEL FLANGES
Naylor Spiral Pipe Co.
ROLLS (Chilled Iron & Gray Iron)
Farrel-Birmingham Co., Inc.
Lobdell Car Wheel Co.
Shartle Bros. Machine Co.
Valley Iron Works
ROLLS (Embossing)
Perkins & Son, Inc., B. F.
John Waldron Corp.
ROLLS (Calender)
Perkins & Son, Inc., B. F.
John Waldron Corp.
ROLLS (Iron, Rubber, Wood)
Baker Manufacturing Corp
ROLLS (Paper)
John Waldron Corp.
Goodrich Rubber Co.
Horne & Sons Co. J. H.
ROLLS (Rubber or Rubber Covered)
American Wringer Co.
ROSIN
Hercules Powder Co.
ROSIN SIZE
American Delthirna Corp.
General Naval Stores Co., Inc
Hercules Powder Co.
Kalbfleisch Corp., The
Paper Makers Chemical Co
ROTARY BLEACHING BOILERS
Biggs Boiler Works Co.
Manitowoc Eng. Works
ROTARY CHIP SCREENS
Waterville Iron Works
ROTARY PULP SCREENS
Bird Machine Company
Montague Machine Co.
ROTARY PRINTING PRESSES
Potdevin Machine Co., The
ROTARY SCREENS
Bird Machine Co.
Moore & White Co.
Valley Iron Works
ROUND TANKS
Kalamazoo Tank & Silo Co.
Stearns Lumber Co., A. T.
RUBBER BELTING
Dayton Rubber Mfg. Co.
RUBBER COVERED ROLLS
American Wringer Co.
SAND & POLISHING MACHINES
Waldron, John, Corp.
Hooker Electrochemical Co.
Pennsylvania Salt Co.
SATURATING MACHINES
Gibbs-Brower Co.
Moore & White Co.
Shartle Bros. Machine Co.
Waldron, John, Corp.
SAVE ALL WIRES
Baker Manufacturing Corp.
Green Bay Wire Works
SAVEALLS
Baker Manufacturing Corp.
Bird Machine Co.
De Laval Steam Turbine Co
Filtration Engineers, Inc.
Glens Falls Machine Works
Green Bay Foundry & Mach Co.
Moore & White Co.
Oliver United Filters Inc.
Shartle Bros. Machine Co.
SAW SHARPENERS
Covel-Hanchett Co.
SCALES
Richardson Scale Co.
SCALES (Automatic Dial)
Kalbfleisch Corporation, The
SCORE TESTERS
Thwing Instrument Co.
SCREEN PLATE
Baker Manufacturing Corp.
Green Bay Foundry & Mach Co.
Hardy & Sons Co., W. A.
Hendrick Mfg. Co.
Union Screen Plate Co.
SCREENS
Baker Manufacturing Corp
Beloit Iron Works
Bird Machine Co.
Glens Falls Machine Works
Horne & Sons Co., J. H.
Moore & White Co.
Shartle Bros. Machine Co.
Valley Iron Works
SEALING TAPE (Gummed)
Paper Manufacturers, Inc
SEMI-STEEL PULLEYS
Jones Foundry & Machine Co W A
SHAKER CHIP SCREENS
Waterville Iron Works
SHOWER PIPES
Bird Machine Company
DeZurik Showers Co., The
Emerson Mfg. Co.
Green Bay Foundry & Mach Co.
Moore & White Mfg. Co.
Roberts Mfg. Co.
Shartle Bros. Machine Co.
Paper & Textile Machinery Co., The
SHOWERS (Foam Laying)
DeZurik Shower Co., The
SHREDDERS (Pulp and Paper)
Carthage Machine Co.
Central Machine Works
Jeffrey Mfg. Co.
Ryther & Pringle Co
Taylor Stiles & Co
SILICATE OF SODA
Philadelphia Quartz Co
SIZING PROCESS
American Delthirna Corp
SKIDDIEM-ONS
Central Machine Works
SLASHERS
Murray, D. J., Mfg. Co.
Ryther & Pringle
Waterville Iron Works
SLIME REMOVERS
Magnuson Products Co
SLITTERS AND REWINDERS
Beloit Iron Works
Cameron Machine Co.
Dietz Machine Works
Gibbs-Brower Co.
Inman Manufacturing Co.
Langston Co., Samuel M.
Moore & White Co.
Shartle Bros. Machine Co.
Waldron Corporation, John
SLUICE GATES
Dayton Beater & Hoist Co.
Hunt Machine Co., Rodney
SODA ASH
Diamond Alkali Company
Mathieson Alkali Works, Inc.
Pennsylvania Salt Mfg. Co.
Solvay Process Co.
SORTING TABLES
Moore & White Co.
SPECIAL MACHINERY
Paper Converting Machine Co. Inc.
John Waldron Corp.
SPEED CHANGES (Variable)
Moore & White Co.
SPEED REDUCERS
De Laval Steam Turbine Co.
Foote Bros. Gear & Machine Co.
Link-Belt Co., The
Jones Foundry & Machine Co., W. A.
Mid West-Fulton Machine Co., The
Philadelphia Gear Works
SPEED REDUCERS (Herring Bone)
De Laval Steam Turbine Co.
Farrel-Birmingham Co.
Link Belt Co.
Philadelphia Gear Works
SPEED REDUCING GEARS (Double Helical)
De Laval Steam Turbine Co.
Philadelphia Gear Works
SPIRAL BEVEL GEAR DRIVES
Bagley & Sewall Co.
SPIRAL BEVEL GEAR DRIVE STANDS
Moore & White Co.
Philadelphia Gear Works
SPIRAL CONVEYORS
Caldwell & Son Co., H. H.
SPIRAL LOCK-SEAM PIPE
Naylor Pipe Co.
SPLITTERS
Waterville Iron Works
STACKS AND BREECHINGS
Biggs Boiler Works Co.
STARCH
Corn Products Refining Co.
STEAM TRAPS
Davis Regulator Co.
STAIR TREADS (Non-Slip)
American Pressed Steel Co.
Norton Co.
STAVE PIPE
Stearns Lumber Co., A. T.
STEAM SEPARATORS
Mid West-Fulton Machine Co., The
Stickle Steam Specialties Co.
Walworth Co.
STEEL CORES
Fabricated Steel Products Co.
STEEL PLATE CONSTRUCTION
Alloy Steel Products Co.
Downingtown Iron Works,
STEAM REGULATORS
Davis Regulator Co.
STEAM TRAPS
Mid West-Fulton Machine Co.,
Ryther & Pringle Co.
Stickles Steam Specialties Co.
STEAM TURBINES
Terry Steam Turbine Co., The
STEAM VALVES
Mid West-Fulton Machine Co.,
Stickles Steam Specialties Co
STEEL (Electric Furnace)
Timken Roller Bearing Co
STEEL (Open Hearth)
Timken Roller Bearing Co
STEEL (Stainless)
Jones & Sons Co., E D
STEEL PLATE CONSTRUCTION
Biggs Boiler Works Co
Hendrick Mfg. Co.
Manitowoc Eng. Works
STOCK CUTTERS
Perkins & Sons, Inc., B. F
STOCK PUMPS
Frederick Iron & Steel Co
STOCK REGULATORS
Baker Manufacturing Corp
Bailey Meter Co.
Merritt Engineering & Sales Corp. The
Trimbey Machine Co.
STOKERS
American Eng. Co.
Babcock & Wilcox Co.
STUFF CHESTS
Hauser-Stander Tank Co.
Jones & Sons Co., E. D.
Kalamazoo Tank & Silo Co.
Lawrence Mach. and Pump Co
Mid-West Fulton Machine Co
Moore & White Co
Shartle Bros. Machine Co.
Stearns Lumber Co., A. T.
Noble & Wood Machine Co.
Valley Iron Works Co.
Woolford Wood Tank Mfg Co., G.
STUFF EJECTORS
Nash Engineering Co.
STUFF PUMPS
Frederick Iron & Steel Co.
Noble & Wood Machine Co.
Shartle Bros. Machine Co.
Valley Iron Works Co.
Warren Steam Pump Co.
STRAW MAKING MACHINERY
Samuel M. Langston Co.
SUCTION BOX COVERS
Baker Manufacturing Corp.
Emerson Mfg. Co.
Horne & Sons Co. J. H.
Menasha Wood Split Pulley Co.
Moore & White Co.
SUCTION BOXES (Roller)
Magnuson Products Corp.
Norwood Engineering Co.
SUCTION ROLLS
Magnuson Products Corp.
Paper & Textile Machinery Co., The
SULPHITE (Bleached and Unbleached)
Andersen & Co., J.
Borregaard Co., Inc., The
Brown Co., Inc.
Castle & Overton, Inc.
Perkins-Goodwin Co.
Price & Pierce, Ltd.
SULPHITE MILL EQUIPMENT
E. R. Barker
SULPHITE PROCESS
Barker, E. R.
SULPHUR
Texas Gulf Sulphur Co
SULPHUR DICHLORIDE
Hooker Electrochemical Co.
SULPHUR MONOCHLORIDE
Hooker Electrochemical Co.
SULPHUR YL CHLORIDE
Hooker Electrochemical Co.
SULPHUR FURNACES
Glens Falls Machine Works
SUPERCALENDER
Perkins & Son, Inc., B. F.
SUPERHEATERS (Steam)
Babcock & Wilcox Co.
SYSTEMS (Waste Heat Recovery)
Babcock & Wilcox Co.
TABLE ROLLS
American Wringer Co.
TACHOMETERS
Taylor Instrument Co.
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Taylor Instrument Co.
TANKS (Acid)
Biggs Boiler Works Co.
Downingtown Iron Works,
Hauser-Stander Tank Co.
Kalamazoo Tank & Silo Co.
Woolford Wood Tank Mfg.
TANKS (Agitator)
Biggs Boiler Works Co.
Downingtown Iron Works,
Hauser-Stander Tank Co.
Kalamazoo Tank & Silo Co.
Woolford Wood Tank Mfg Co., G.
TANKS (Chrome Nickel)
Alloy Steel Products Co. Co., G.
TANKS (IRON and STEEL)
Baker Manufacturing Corp.
Biggs Boiler Works Co.
Downingtown Iron Works,
Hendrick Mfg. Co.
TANKS (Water, Oil, Etc.)
Biggs Boiler Works Co.
Downingtown Iron Works,
Hauser-Stander Tank Co.
Hendrick Mfg. Co.
Kalamazoo Tank & Silo Co.
Woolford Wood Tank Mfg Co., G.
TANKS (Tile)
Kalamazoo Tank & Silo Co.
TANKS (Wood)
Emerson Mfg. Co.
Hauser Stander Tank Co.
Hunt Machine Co., Rodney
Kalamazoo Tank & Silo Co.
Shartle Bros. Machine Co.
Woolford Wood Tank Mfg. Co. Co., G.
TALC
Loomis Talc Corp. W. H.
TEAR TESTERS
Thwing Instrument Co.
TEMPERATURE RECORDERS
General Electric Co.
Thwing Instrument Co.
Cambridge Instrument Co.
TENSILE TESTERS
Foreign Paper Mills Inc.
Perkins & Sons, Inc., B. F

TESTERS (Bursting Strength)
Perkins & Son, Inc., B. F.
TESTING LABORATORY
E. I. DuPont De Nemours & Co., Inc.
Electrical Testing Labs.
Little, Inc., Arthur D.
U. S. Testing Co., Inc.
THICKENERS
Baker Manufacturing Corp.
Bird Machine Company
Filtration Engineers, Inc.
Oliver United Filters Inc.
Shartle Bros. Machine Co.
United Filters Corp.
THRUST ROLLER BEARINGS
Bantam Ball Bearing Co., The
TIMBER ESTIMATES
Sewall, James W
TOILET FOLDING MACHINES
Paper Converting Machine Co., Inc.
TOILET WINDERS
Dietz Machine Works
TOWEL CABINETS
Griffith-Hope Co.
TOWEL INTERFOLDING MACHINES
Dietz Machine Works
TOWEL FOLDING MACHINES
Paper Converting Machine Co., Inc.
TRACTION CLARIFIER
Dorr Company, The
TRANSMISSION MACHINERY
Bird Machine Company
Caldwell & Son Co., H. H.
Dayton Rubber Mfg. Co.
De Laval Steam Turbine Co.
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Link-Belt Co., The
Lewellen Manufacturing Company
Montague Machine Co.
Timken Roller Bearing Co.
TRUCK CASTERS
Fairbanks Co.
TRUCK WHEELS
Fairbanks Co.
TRUCKS (Hand)
Fairbanks Co.
TRUCKS
Fairbanks Co.
Ryther & Pringle Co.
Moore & White Co.
Central Machine Works
TRUCKS, SKID-EM-ON
Central Machine Works
TRUCKS (Special Purpose)
Fairbanks Co.
TRUCKS (Wheelbarrow)
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TUBING (Seamless Steel)
Babcock & Wilcox Co.
Timken Roller Bearing Co.
TUBS (Wood)
Hauser-Stander Tank Co.
De Laval Steam Turbine Co.
TURBINES (Hydraulic)
DeLaval Steam Turbine Co.
Smith, S. Morgan
Terry Steam Turbine Co.
TURBINES (Water)
De Laval Steam Turbine Co.
Terry Steam Turbine Co.
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DeLaval Steam Turbine Co.
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Buffaloo Steam Pump Co.
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Oliver United Filters, Inc.
VALVES
Appleton Machine Co., The
Carthage Machine Co.
Consolidated Ashcroft Hancock Co.
Davis Regulator Co.
Eastwood Wire Corp.
Fairbanks Co.
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Mid West-Fulton Machine Co.
Schutte & Koerting Co.
Shartle Bros. Machine Co.
Stickle Steam Specialties
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VALVES (Bronze)
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Eastwood Corporation
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VALVES (Automatic Water Control)
Merritt Engineering & Sales Corp., The
VALVES (Chrome Nickel Steel)
Alloy Steel Products Co.
Hardy & Sons Co., Wm. A.
VALVES (Gate)
Hayton Pump & Blower Co.
VALVES (Quick Dump)
Baker Manufacturing Corp.
Dayton Water & Hoist Co.
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Shartle Bros. Machine Co.
VALVES (Non-return)
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VALVES (Regulating)
Davis Regulator Co.
Stickles Steam Specialties Co
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VALVES (Absorption System)
Ross Engineering Co., J. C.
Stickle Steam Specialties
Walworth Co.
VALVE SPECIALTIES
Davis Regulator Co.
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Link Belt Co.
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Valley Iron Works
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DeZurik Shower Co., The
WINDERS
Baker Corp. The
Cameron Machine Co.
Langston Co., Sam L.
Moore & White Co.
Shartle Bros. Machine Co.
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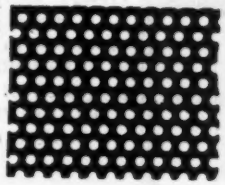

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INDEX TO ADVERTISERS

A

	Page
Acer McLernon & Co. Ltd	—
Air Preheater Corporation	—
Albany Felt Co.	—
Alberne Stone Co.	—
Allis Chalmers Mfg. Co.	—
Alloy Steel Products Co.	—
American Deithirna Corp.	—
American Engineering Co.	—
American Pressed Steel Co.	—
American Pulp & Paper Mill Supt's. Ass'n.	—
American Society for the Control of Cancer	—
American Voith Contact Co.	—
American Wringer Co., Inc.	—
Andersen & Co., J.	76
Appleton Machine Co.	—
Appleton Wire Works Inc.	66
Appleton Woolen Mills	68
Armstrong Cork & Insulation Co.	—
Austin Co.	—

B

Babcock & Wilcox Co.	66
Badenhausen Corporation	—
Bagley & Sewall Co.	—
Bahr Bros. Mfg. Co.	—
Baker Corporation	—
Bantam Ball Bearing Co., The	8
Barker, E. R.	—
Bausch & Lomb Optical Co.	—
Beloit Iron Works	Front Cover
Biggs Boiler Works Co.	—
Birdsboro Steel Foundry Machine Co.	—
Bird Machine Co.	21
Black-Clawson Co.	27-28
Blaw-Knox Co.	—
Borregaard Co., The	57
Bowsher & Co., N. P.	67
Brown Co.	—
Brown Instrument Co.	—
Buffalo Steam Pump Co.	68
Bulkley, Dunton & Co.	74

C

Cambridge Instrument Co.	—
Cameron Machine Co.	—
Carey, James L.	—
Castle & Overton, Inc.	—
Central Machine Works	66
Centrifugal Engineering & Patents Corp.	—
Chemipulp Process, Inc.	—
Chromium Corp. of America	—
Cities Service Oil Co.	—
Clark-Aiken Co.	—
Clinton Corn Syrup Refining Co.	—
Coe Mfg. Co.	—
Consolidated Products Co.	65
Corn Products Refining Co.	—
Corner Brook Fdy. & Mach. Co.	—
Crossman, George	—
Cutler-Hammer Manufacturing Co.	—

D

Davis Co., Frank H.	64
Davis Regulator Co.	—
Dayton Beater & Hoist Co.	66
De Laval Steam Turbine Co.	68
DeZurik Shower Co., The	—
Diamond Alkali Co.	—
Dietz Machine Works	—
Dilts Machine Works	25
Dominion Engineering Works, Ltd.	—
Downingtown Iron Works	—
Downingtown Mfg. Co.	23
Draper Bros. Co.	55
Du Pont de Nemours & Co., E. I.	—
Duriron Company, Inc., The	—

E

Eastwood Corporation	—
Edgar Bros. Company	61
Electrical Testing Laboratories	—
Electro Bleaching Gas Co.	10
Elixman Paper Core Co.	57
Elwell - Parker - Electric Co.	—
Esleeck Mfg. Co.	—
Expositions of Chemical Industries	—

F

Fabricated Steel Products	—
Fairbanks Co.	—
Farrel-Birmingham Co.	59
Ferguson Co., H. K.	—
Ferguson & Co., Hardy S.	67
Fibre Making Process, Inc.	—
Fidalgo Drying Systems, Inc.	—
Fifth Avenue Bldg., The	—
Filtration Engineers, Inc.	66
Fitchburg Duck Mills	—
Flexible Steel Lacing Co.	—
Foreign Paper Mills Inc.	—
Frederick Iron & Steel Co.	—
Fuller Lehigh Co.	—

G

Gates Rubber Co., The	—
Geigy Company, Inc.	—
General Dyestuffs Corp.	59
General Electric Co.	—
Gibbs-Brower Co., Inc.	—
General Naval Stores Co.	—
Glens Falls Mch. Works	61
Goebel, A. G.	—
Goodrich Rubber Co., The B. F.	—
Goodyear Tire & Rubber Co.	—
Green Bay Wire Works	—
Green-Tweed & Co.	—
Griffith-Hope Co.	—

H

Hamblet Machine Co.	75
Hammermill Paper Co.	—
Hardy, George F.	67
Hardy & Sons Co., W. A.	—
Harrington & King Perforating Co.	67
Harris Seybold Potter Co.	—
Hauser-Stander Tank Co.	—
Hayton Pump & Blower Co.	—
Heinrich, H. H., Inc.	—
Heller & Merz Corp.	74
Hendrick Mfg. Co.	66
Hercules Powder Co.	—
Hooker Electrochemical Co.	—
Horne & Sons Co., J. H.	59
Huber, J. M., Inc.	—
Hudson Sharp Mch. Co.	—
Hunt Machine Co., Rodney	—
Huyck & Sons, F. C.	—

I

Inman Mfg. Co.	—
International Pulp Co.	—
International Wire Works	66
Inversand Company	—

J

Jenkins Bros., Inc.	—
Jenssen Co., G. D.	63
Johns-Manville Corp.	—
Johnson & Wierk, Inc.	66
Jones & Sons Co., E. D.	2
Jones, W. L., Inc.	—
Jones, W. A., Foundry & Machine Co.	—

INDEX TO ADVERTISERS

K

	Page
Kalamazoo Tank & Silo Co.	66
Kalamazoo Vegetable Parchment Co.	—
Kalbfleisch Corporation, The	—
Kellogg Co., M. W.	67
Knox Woolen Co.	74

L

Lagerloef Trading Co., Inc.	—
Land-O'Lakes Creameries, Inc.	—
Langston Co., Samuel M.	3
Lawrence Machine & Pump Co.	63
Layne & Bowler, Inc.	—
Lefren, Inc., Karl A.	66
Lennig & Co., Chas.	6
Lewellen Mfg. Co.	—
Link-Belt Co.	—
Little, Arthur D.	66
Lockport Felt Co.	4
Lockwood's Directory	68
Lobdell Car Wheel Co.	—
Loomis Talc Corp., W. H.	—

M

Magnuson Products Corp.	9
Manitowoc Engineering Works	—
Mathieson Alkali Works	38
Merritt Engineering & Sales Co.	67
Mid States Gummed Paper Co.	—
Midwest-Fulton Machine Co.	—
Mine & Smelter Supply Co.	—
Montague Machine Co.	7
Monarch Metal Co.	—
Moore & White Co.	35
Mundt & Sons, Charles	73
Murray Mfg. Co., D. J.	—

N

Nash Engineering Co.	4
National Aniline & Chemical Co.	—
Naylor Pipe Co.	—
Neumeyer & Dimond	—
New Orleans Association of Commerce	—
Noble & Wood Machine Co.	—
Nortmann-Duffke Co.	—
Norton Co.	—
Norwood Engineering Co.	—

O

Oakite Products, Inc.	—
Oliver United Filters Inc.	66
Orbison & Orbison	—
Orr Felt & Blanket Co.	—
Oxford Paper Co.	—

P

Paper Converting Machine Co.	—
Paper Manufacturers Co., Inc.	66
Paper Makers Chemical Corp.	68
Paper Roll Pulp Co.	—
Paper & Textile Machinery Co.	—
Pennsylvania Salt Mfg. Co.	—
Perkins & Son, Inc., B. F.	—
Perkins Goodwin Co.	—
Permutit Co., The	—
Philadelphia Gear Works	—
Philadelphia Quartz Co.	63
Pickles, W. F.	55
Potdevin Machine Co.	61
Price & Pierce, Ltd.	57
Propellair, Inc.	—
Pulp Bleaching Corp.	—
Pulp & Paper Trading Co.	76
Pusey and Jones Corp.	—

R

Reliable Machine Co.	66
Rhoads & Sons, J. E.	—
Rice, Barton & Fales Co.	—
Richardson Scale Co.	—
Ross Engineering Corporation, J. O.	33
Ryther & Pringle Co.	68

S

Scovel, Wellington & Co.	—
Sewall, James W.	—
Shartle Bros. Mach. Co.	27-28
Shenango-Penn Mold Co.	—
Shuler & Benninghofen	—
Simonds Worden White Co.	—
Simons, V. D.	—
S. K. F. Industries	—
Smidth, F. L. & Co.	—
Smith, Frederick L.	66
Smith Co., S. Morgan	—
Smith & Winchester Manufacturing Co.	6
Solvay Sales Corp.	—
Standard Oil Company (Indiana)	—
Stearns Lumber Co., A. T.	—
Stebbins Engr. & Mfg. Co.	—
Stevens & Thompson Paper Co.	—
Stickel Steam Specialty Co.	—

T

Taylor, H. S.	67
Taylor Instrument Co.	—
Taylor Stiles & Co.	63
Terry Steam Turbine Co.	—
Texas Gulf Sulphur Co.	55
Textile Furnishing Machinery Corp.	55
Thwing Instrument Co.	—
Ticonderoga Mach. Works	73
Timken Roller Bearing Co.	—
Tolhurst Machine Works	—
Transcello Paper Co.	—
Trimbey Machine Works	75
Tube-Turns, Inc.	—
Turner Halsey Co.	—

U

Union Screen Plate Co.	—
Union Talc Co.	66
United Carbon Co.	7
U. S. Testing Co.	—

V

Vacuum Oil Co.	Back Cover
Valley Iron Works Co.	31
Vanderbilt Co., R. T.	—

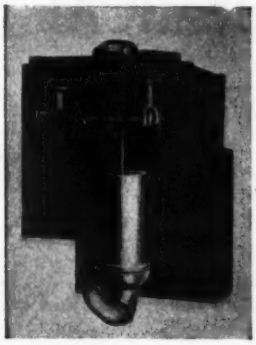
W

Waldron Corp., John	63
Walmsley, Chas. Co.	—
Walworth Co.	5
Warren Steam Pump Co.	77
Waterbury Felt Co.	—
Waterville Iron Works	—
Westinghouse Electric & Mfg. Co.	—
West Virginia Pulp & Paper Co.	57
Wiener, J. A.	—
Williams & Co., C. K.	67
Wisconsin Wire Works	—
Wood Products Co.	73
Woolford Wood Tank Mfg. Co.	—

Z

Zabriskie, Arthur S., Inc.	65

Weight Regulating Stuff Box



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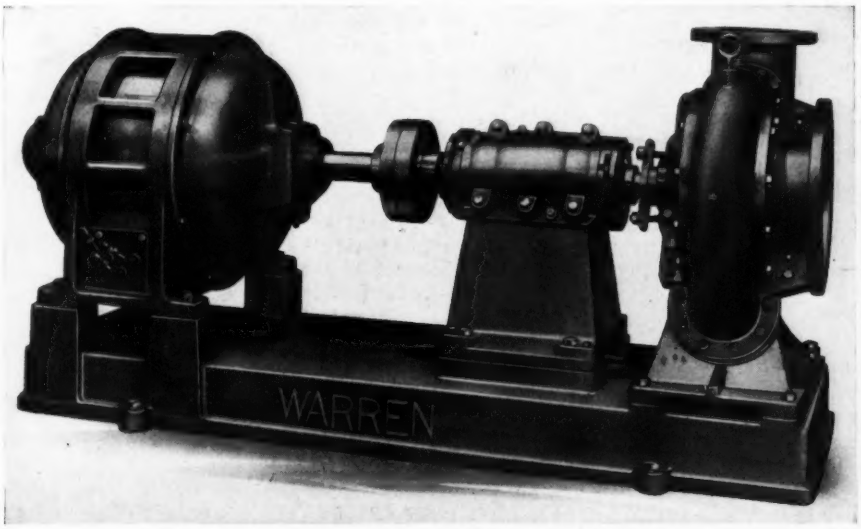

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